Published in final edited form as:

Psychiatr Serv. 2020 July 01; 71(7): 678–683. doi:10.1176/appi.ps.201900457.

Implementing Technology-Supported Care for Depression and Alcohol Use Disorder in Primary Care in Colombia: Preliminary Findings

William C. Torrey, M.D.[#], Magda Cepeda, M.D., Ph.D.[#], Sergio Castro, M.D., Sophia M. Bartels, B.A., Leonardo Cubillos, M.D., M.P.H., Fernando Suárez Obando, M.D., Pablo Martínez Camblor, Ph.D., José Miguel Uribe-Restrepo, M.D., Makeda Williams, Ph.D., Carlos Gómez-Restrepo, M.D., Lisa A. Marsch, Ph.D.

Department of Psychiatry (Torrey, Bartels, Cubillos, Marsch) and Department of Biomedical Data Science (Camblor), Geisel School of Medicine, Dartmouth College, Hanover, New Hampshire; Department of Clinical Epidemiology and Biostatistics (Cepeda, Castro, Gómez-Restrepo), Institute of Human Genetics (Suárez Obando), and Department of Psychiatry and Mental Health (Uribe-Restrepo, Gómez-Restrepo), Pontificia Universidad Javeriana, Bogotá, Colombia; Office for Research on Disparities and Global Mental Health, National Institute of Mental Health, Bethesda, Maryland (Williams).

[#] These authors contributed equally to this work.

Abstract

Objective: Depression and alcohol use disorder are among the most common causes of disability and death worldwide. Health care systems are seeking ways to leverage technology to screen, evaluate, and treat these conditions, because workforce interventions alone, particularly in low- and middle-income countries, are insufficient. This article reports data from the first year of implementation of a technology-supported, systematic approach to identify and care for persons with these disorders in primary care in Colombia.

Methods: A care process that includes waiting room kiosks to screen primary care patients, decision support tablets to guide doctors in diagnosis and treatment, and access to digital therapeutics as a treatment option was implemented in two primary care clinics, one urban and one in a small town. The project collected data on the number of people screened, diagnosed, and engaged in the research and their demographic characteristics.

Results: In the first year, 2,656 individuals were screened for depression and unhealthy alcohol use in the two clinics. Primary care doctors increased the percentage of patients diagnosed as having depression and alcohol use disorder from next to 0% to 17% and 2%, respectively.

Conclusions: Early experience with implementing technology-supported screening and decision support for depression and alcohol use disorder into the workflow of busy primary care clinics in Colombia indicates that this care model is feasible and leads to dramatically higher rates of

Send correspondence to Dr. Torrey (william.c.torrey@dartmouth.edu).

An earlier version of these data was presented at the 10th Anniversary Conference: Global Mental Health Research Without Borders, Bethesda, Maryland, April 8–9, 2019.

diagnoses of these conditions. Diagnosis in these settings appeared to be easier for depression than for alcohol use disorder.

Depression and alcohol use disorder are major contributors to disability and death across the globe (1–3). Health care systems in many parts of the world are seeking ways to address the suffering caused by these difficulties. One strategy is to systematically screen, assess, diagnose, and, when indicated, treat or refer patients who present for services in primary care (4, 5). Digital technology interventions have the potential to make these practice improvements more efficient, effective, and scalable (6).

In Colombia, studies show that depression and alcohol use disorder are common and that only 11% of individuals with a mental disorder receive mental health care (7). The Colombian government is committed to addressing psychiatric illness. A mental health policy, enacted in 2013 in Colombia, establishes a right to mental health care and promotes a primary care approach (8). However, putting the policy into action at a population level is challenging, in part because primary care workflows do not include systematic screening and assessment for depression and alcohol use difficulties and the medical education system has not emphasized common mental disorders. Therefore, most primary care teams and providers have little formal training in how to approach this work.

To address this challenge, researchers from Colombia and the United States have teamed up on a project funded by the Research Partnerships for Scaling Up Mental Health Interventions in Low- and Middle-Income Countries (Scale-Up Hubs) program of the U.S. National Institute of Mental Health. The goal of the Scale-Up Hubs funding mechanism is to support capacity-building for sustainable, evidence-based practice and in-country implementation research in low and middle-income countries (9, 10). The Detection and Integrated Care for Depression and Alcohol Use in Primary Care (DIADA) project in Colombia involves implementing and evaluating the impact of technology-supported screening, decision support, and digital therapeutic care for depression and alcohol use disorders in routine rural and urban primary care settings. DIADA will implement the practice at six sites over the course of several years and study the process of implementation. In the final year of the study, DIADA will expand research and capacity building to Peru and Chile.

This interim report lays out findings from the first year of the study at the first two sites, one in a large metropolitan area and the other in a small town. This report addresses the following questions: Is it possible to implement a technology-supported screening process in routine primary care clinics in Colombia? Is it possible to train and support primary care doctors to use the screening findings and decision support tools to make a diagnosis of depression or alcohol use disorder in busy primary care practices? Does the screening and decision support lead to higher rates of detection of depression and alcohol use difficulties in the clinics than before the intervention? Do the screening results match expected rates of and demographic characteristics associated with depression and alcohol use disorder in Colombia? Are the diagnoses of depression and alcohol use disorders made at the expected rates, given the characteristics of the screening instruments? Are people diagnosed as having

depression or alcohol use disorder willing to participate in a study that includes access to digital therapeutics in these settings?

METHODS

Study Design

DIADA is a 5-year multicenter intervention study that aims to evaluate the implementation of technology-supported screening, diagnosis, and care of depression and alcohol use disorder among adults presenting for primary care visits at six sites in Colombia. A new primary care site implements the intervention every 6 months. The research is using a stepped wedge design (11), meaning that implementation data are collected at baseline and then periodically at all sites before and after implementation. This study design allows sites to be compared with themselves before and after the implementation and with each other over time. The overall study will examine many aspects of implementation and clinical and research capacity building.

After a pilot phase that allowed the study team to test and improve implementation processes, DIADA was launched in the first site in February 2018. This report presents 1 year of data from the first site and 6 months of findings from a second site that implemented the program 6 months later. The first site is a primary care clinic in a major metropolitan area that serves a population of mostly middle- and high-income patients. The second primary care site serves a small town and the surrounding rural area and has a population of mainly low- and middle-income patients.

Model Description

The project recruited sites that were interested and willing to change their routine flow of patient care. This new model of care includes screening, decision support, and the opportunity for digital therapeutic treatment for people with depression or unhealthy alcohol use. The screening, diagnosis, and study participation data are collected and stored in a secure Web-based site.

The implementation process includes 1 day of on-site training of the primary care providers by a DIADA psychiatrist on the assessment and care of persons with depression and alcohol use disorders and building technology-supported screening and decision support for these disorders into the routine flow of care. Specifically, after checking into the clinic, patients are directed to dedicated kiosks that are located in the clinic waiting rooms. Patients have the choice of answering the questions on their own or with the assistance of staff. Patients are first screened with the Whooley test (12), a two-question, yes-no screen for depression that is recommended by the Colombian clinical guidelines (13), and with the Alcohol Use Disorders Identification Test–Consumption (AUDIT-C) (14) for unhealthy alcohol use. If these screens are positive, the patients are asked to complete the full Patient Health Questionnaire–9 (PHQ-9) (15) for depression or the full AUDIT (16) for unhealthy alcohol use.

The screening results are communicated to the primary care doctor through the use of two redundant methods. The kiosk prints the results on a piece of paper for patients to hand to

their doctor during the primary care visit, and the results are also sent electronically to the doctor, where they are displayed on a tablet computer–based decision support tool. The tablet contains a concise briefing of the Colombian clinical guidelines for the clinical management of depression and alcohol use disorder (13, 17). The primary care doctor can use the decision support tool to help make a diagnosis and, when indicated, initiate treatment. Although one site has an electronic medical record, the tablet and the electronic screening data are not integrated directly into the record because of cost constraints.

Patients who are diagnosed as having depression or alcohol use disorder are invited to participate in the study, which gives them access to a digital therapeutic software tool that offers evidence-based behavioral therapy for depression or alcohol use disorder. The application, called Laddr, is based on fundamental principles of behavior change and is informed by over 20 randomized clinical trials(18). The tool can be deployed in smartphones or as a Web version for desktop or laptop computers. Whether or not patients decide to join the study, they have access to whatever care is available to them to address depression or alcohol use disorder, such as available medications, psychotherapy, or referrals. Before the start of the DIADA project, the two clinics did not screen for depression and unhealthy alcohol use; generally, they addressed these issues during visits only if the patient came in explicitly requesting help for them, and they usually referred patients to psychiatrists or psychologists for care rather than providing it themselves. Consequently, before DIADA, these diagnoses were very rarely made.

The DIADA project has been approved by the institutional review boards of the Pontificia Universidad Javeriana and Dartmouth College, and a Data and Safety Monitoring Board for the Scale-Up Hubs of the National Institute of Mental Health.

Statistical Analyses

We performed a descriptive analysis per site of the numbers of positive screenings and physician-confirmed diagnosis of depression and alcohol use disorder. Categorical variables are described with absolute frequencies and percentages. In addition, we performed a subgroup analysis of the distribution of physician-confirmed diagnoses based on sex and age, categorized as ages 18–44 or ≥45, using a chi-square test. For this report, we considered $p < 0.05$ to be significant.

RESULTS

Between February 12, 2018, and February 11, 2019, the clinics screened 2,656 patients, of whom 1,943 were in the urban clinic and 713 were in the small-town clinic (Tables 1 and 2). The tables show the number and percentage of patients who screened positive and who were given diagnoses, and, of those with diagnoses, the number and percentage who joined the study. Most of those who were given diagnoses and joined the study had either depression or alcohol use disorder, but 18 had both. The sex and age (18–44 versus ≥45) of those who screened positive and were given a diagnosis were also compared (Tables 3 and 4).

Overall, the diagnosis rate was 17% for depression and 2% for alcohol use disorder. The findings in the two clinics were similar. Around 55% of those given a diagnosis of

depression or alcohol use disorder joined the study, which provides them with access to digital therapy and tracks the course of their illness. For depression, a significantly higher proportion of women than of men screened positive (13% versus 9%) and were given a diagnosis (18% versus 15%). In contrast, for alcohol use disorder, a significantly lower proportion of women than men screened positive (2% versus 11%) and were given a diagnosis (1% versus 5%). No significant difference was found in positive depression screening and diagnosis between those ages 18–44 and those ages 45, whereas for alcohol use disorder, the younger group was much more likely than the older group to screen positive (11% versus 3%) and to be given a diagnosis (5% versus 1%) of alcohol use disorder.

DISCUSSION

Technology-assisted screening and decision support was able to be implemented in DIADA's first two primary care sites in Colombia, one urban and the other in a small town. The participating clinics are located in very different environments, yet the findings were very similar in terms of the percentage of people who screened positive and were given diagnoses. In the first year, the project was able to screen thousands of individuals, and with the aid of training and tablet-based decision support, primary care doctors were able to evaluate and diagnose depression and alcohol use disorder in their busy clinics. The rate of diagnosis of depression and alcohol use disorder rose from next to 0% to 17% and 2%, respectively. Around 55% of patients who were given diagnoses of either depression or alcohol use disorder went on to join the study, which gives them the opportunity to augment usual care with digital therapy.

Overall, the screening and diagnosis rates conformed to expectation, building confidence that this model of care is detecting and diagnosing the individuals with depression and alcohol use disorders among patients presenting for primary care visits. Regarding depression, a recent nationwide Colombian mental health survey showed a depression population rate of 9.6% (19, 20). The depression diagnosis rate of 17% found in the DIADA study is higher, which would be expected given that the population that was screened was seeking help in primary care and predominantly female—two factors which are likely to increase risk of depression (21–23). The Colombian mental health survey and the DIADA study use different methods for identifying depression, which could also account for the difference. For alcohol use, the Colombian mental health survey screened with the AUDIT-C and then gave the full AUDIT for those who screened positive (24). This same process is used in the DIADA study to screen for unhealthy alcohol use. The mental health survey found alcohol use disorder rates of 12% among individuals ages 18–44 and 6% among those ages 45, which is very close to the DIADA study screening findings of 11% for the 18–44 group and 3% for the 45 group. The DIADA study rate may have been slightly lower than the survey rate, because the population screened in the two clinics was mostly women and alcohol use disorder is more common in men (22, 24–26).

The age and sex of patients who screened positive and were given diagnoses also matched expectation. Compared with men, a greater proportion of women experience depression (22), and in this study, a greater percentage of women than men screened positive and were

diagnosed as having depression. The ages of those diagnosed as having depression mirrors the ages of those who were screened. As expected, the pattern was different for alcohol. Alcohol use disorders are more common among young men (22, 24,25), and in the DIADA study, those who screened positive on the AUDIT and those who received a diagnosis of an alcohol use disorder were much younger, compared with the overall screened population, with a greater proportion of males.

Given the psychometric properties of the PHQ-9 and AUDIT in primary care, the doctors in this study appeared to diagnose depression at the expected rate and alcohol use disorder at a less than expected rate. The specificity of a depression diagnosis for a PHQ-9 score of 10 is 0.85 (27). In this study, 73% of individuals with a PHQ-9 of 10 were diagnosed as having depression, which is close to the expected rate. For alcohol use, the specificity of an alcohol use disorder diagnosis with an AUDIT score of 8 is 0.85 in primary care studies (14, 28). In this study, only 38% of those with an AUDIT of 8 were diagnosed as having an alcohol use disorder, which is much lower than expected.

This finding suggests that in a brief doctor's visit in primary care settings in Colombia, that is not explicitly scheduled to address depression or alcohol use, it is much easier to discuss and diagnose difficulties with depression than it is to discuss and diagnose alcohol use disorder. A similar finding was reported in a U.S. Department of Veterans Affairs medical center study, which found that after positive screens, referrals for care for posttraumatic stress disorder and depression were higher, compared with referrals for alcohol use disorder (29). In addition, in Colombia, alcohol use at levels that pose a health risk is culturally normative for men, and thus addressing the risk and making an alcohol use disorder diagnosis in a brief doctor's visit is a challenge. Other studies in locations where normative use of alcohol often falls into the unhealthy use range have found that it is difficult for doctors to talk to patients about alcohol use disorder (30). Studies have also noted that although alcohol screening, assessment, and intervention are widely recommended, they are rarely implemented (31). Even when screening is in place, many people who use alcohol in the unhealthy range do not receive treatment (32). Effective means to support nonjudgmental alcohol health education and brief intervention and treatment in a primary care (or any) setting are needed worldwide (33, 34).

The main limitation of the ongoing DIADA project is that the presence of the researchers studying the clinics is likely to influence the processes being investigated. Researcher presence could have made it easier (or harder) to implement the practice in these two sites than it would have been otherwise. In addition, although the doctors receive training and the screening results are sent to their tablets electronically and handed to them in paper form by the patients, there is no systematic process for documenting that the doctors receive the screening results. In these two busy clinics, the doctor may not always have checked the tablet, and the patient may have forgotten to hand the paper to the physician. Some patients may have chosen not to give the paper to the doctor to avoid talking about depression or alcohol use. Patients are less likely to be given a diagnosis if the screening information is not received by the doctors, which decreases the yield of diagnoses from the positive screens. Finally, this implementation study did not include independent research verification of the diagnoses made by the primary care doctors in their routine flow of care. Therefore, for

example, some of the patients with PHQ-9 scores between 5 and 9 may have had normal sadness or grief that was overdiagnosed as depression, and the depression of some patients with PHQ-9 scores >10 may have been missed.

CONCLUSIONS

The experience to date of the DIADA project in Colombia is that technology-enhanced screening combined with training and technology-supported decision support is feasible to implement and leads to dramatically higher diagnoses of depression and alcohol use disorder in primary care settings. Interim findings support this approach to improving identification and care for these painful, disabling, and deadly health conditions that are common and undertreated across the world. As has been found elsewhere, compared with alcohol use disorder, depression was easier to address and diagnose after screening in a primary care visit. The DIADA project findings can inform policy makers and other stakeholders who are seeking to scale up mental health care in primary care settings in low- and middle-income settings globally.

Acknowledgments

Research reported here was funded under award number 1U19MH109988 by the National Institute of Mental Health of the National Institutes of Health (NIH) (principal investigators: Dr. Marsch and Dr. Gómez-Restrepo). The contents are solely the opinion of the authors and do not necessarily represent the views of the NIH or the U.S. government.

Dr. Marsch is affiliated with the business that developed the mobile intervention platform used in this research. This relationship is extensively managed by Dr. Marsch and her academic institution. The other authors report no financial relationships with commercial interests.

REFERENCES

1. Alcohol. Geneva, World Health Organization, 2018 <https://www.who.int/en/news-room/fact-sheets/detail/alcohol>
2. Depression and Other Common Mental Disorders: Global Health Estimates. Geneva, World Health Organization, 2017
3. Global Burden of Disease Study 2013 Collaborators: global, regional, and national incidence, prevalence, and years lived with disability for 301 acute and chronic diseases and injuries in 188 countries, 1990–2013: a systematic analysis for the Global Burden of Disease Study 2013. *Lancet* 2015; 386:743–800 [PubMed: 26063472]
4. US Preventive Services Task Force: screening for depression in adults: US Preventive Services Task Force recommendation statement. *Ann Intern Med* 2009; 151:784–792 [PubMed: 19949144]
5. Curry SJ, Krist AH, Owens DK, et al.: Screening and behavioral counseling interventions to reduce unhealthy alcohol use in adolescents and adults: US Preventive Services Task Force recommendation statement. *JAMA* 2018; 320:1899–1909 [PubMed: 30422199]
6. Marsch LA, Gustafson DH: The role of technology in health care innovation: a commentary. *J Dual Diagn* 2013; 9:101–103 [PubMed: 23599690]
7. 2015 National Mental Health Survey [in Spanish]. Bogotá, DC, Colombia, Ministry of Health and Social Protection, 2015
8. Through Which the Mental Health Law Is Issued and Other Provisions Are Issued [in Spanish], law no 1616, Congress of Colombia, 2013
9. Research Partnerships for Scaling up Mental Health Interventions in Low- and Middle-Income Countries. Bethesda, MD, National Institute of Mental Health, 2019 <https://www.nimh.nih.gov/about/organization/cgmhr/scaleuphubs/index.shtml>

10. Collins PY, Pringle BA: Building a global mental health research workforce: perspectives from the National Institute of Mental Health. *Acad Psychiatry* 2016; 40:723–726 [PubMed: 26586615]
11. Brown CA, Lilford RJ: The stepped wedge trial design: a systematic review. *BMC Med Res Methodol* 2006; 6:54 [PubMed: 17092344]
12. Bosanquet K, Bailey D, Gilbody S, et al.: Diagnostic accuracy of the Whooley questions for the identification of depression: a diagnostic meta-analysis. *BMJ Open* 2015; 5:e008913
13. Clinical Practice Guideline for Early Detection and Diagnosis of Depressive Episode and Recurrent Depressive Disorder in Adults: Comprehensive Care of Adults With Depressive Diagnosis or Recurrent Depressive Disorder [in Spanish]. Bogotá, DC, Ministry of Health and Social Protection, 2013
14. Bush K, Kivlahan DR, McDonell MB, et al.: The AUDIT alcohol consumption questions (AUDIT-C): an effective brief screening test for problem drinking. Ambulatory Care Quality Improvement Project (ACQUIP). Alcohol Use Disorders Identification Test. *Arch Intern Med* 1998; 158:1789–1795 [PubMed: 9738608]
15. Kroenke K, Spitzer RL, Williams JB: The PHQ-9: validity of a brief depression severity measure. *J Gen Intern Med* 2001; 16:606–613 [PubMed: 11556941]
16. Barbor TF, Higgins-Biddle JC, Saunders JB, et al. AUDIT: The Alcohol Use Disorders Identification Test: Guidelines for Use in Primary Care, 2nd ed Geneva, World Health Organization, 2001
17. Clinical Practice Guidelines for the Early Detection, Diagnosis and Treatment of the Acute Intoxication of Patients With Alcohol Abuse or Dependence [in Spanish]. Bogotá, DC, República de Colombia, Ministerio de Salud y Protección Social, 2013
18. Square2's Laddr Launched. Hanover, NH, Square2 Systems, Inc, 2019 <https://www.square2.co/about.html>
19. Gómez-Restrepo C, Tamayo Martínez N, Bohórquez A, et al.: Depressive and anxiety disorders and associated factors in the Colombian adult population, 2015 National Survey of Mental Health [in Spanish]. *Rev Colomb Psiquiatr* 2016; 45(suppl 1): 58–67 [PubMed: 27993257]
20. Rodríguez V, Moreno S, Camacho J, et al.: Design and implementation of the collection tools for the 2015 Colombian National Survey of Mental Health [in Spanish]. *Rev Colomb Psiquiatr* 2016; 45(suppl 1):9–18 [PubMed: 27993261]
21. Spitzer RL, Williams JB, Kroenke K, et al.: Utility of a new procedure for diagnosing mental disorders in primary care: the PRIME-MD 1000 study. *JAMA* 1994; 272:1749–1756 [PubMed: 7966923]
22. Seedat S, Scott KM, Angermeyer MC, et al.: Cross-national associations between gender and mental disorders in the World Health Organization World Mental Health Surveys. *Arch Gen Psychiatry* 2009; 66:785–795 [PubMed: 19581570]
23. Bertakis KD, Helms LJ, Callahan EJ, et al.: Patient gender differences in the diagnosis of depression in primary care. *J Womens Health Gend Based Med* 2001; 10:689–698 [PubMed: 11571099]
24. de la Espriella Guerrero RA, Rodríguez V, Rincón CJ, et al.: Alcohol consumption in the Colombian population, 2015 National Mental Health Survey [in Spanish]. *Rev Colomb Psiquiatr* 2016; 45(suppl1):76–88 [PubMed: 27993259]
25. Hasin DS, Stinson FS, Ogburn E, et al.: Prevalence, correlates, disability, and comorbidity of DSM-IV alcohol abuse and dependence in the United States: results from the National Epidemiologic Survey on Alcohol and Related Conditions. *Arch Gen Psychiatry* 2007; 64:830–842 [PubMed: 17606817]
26. Rincon-Hoyos HG, Castillo A, Prada SI: Alcohol use disorders and psychiatric diseases in Colombia. *Colomb Med* 2016; 47:31–37 [PubMed: 27226662]
27. Levis B, Benedetti A, Thombs BD: Accuracy of Patient Health Questionnaire–9 (PHQ-9) for screening to detect major depression: individual participant data meta-analysis. *BMJ* 2019; 365:11476 [PubMed: 30967483]
28. Fiellin DA, Reid MC, O'Connor PG: Screening for alcohol problems in primary care: a systematic review. *Arch Intern Med* 2000; 160:1977–1989 [PubMed: 10888972]

29. Maust DT, Mavandadi S, Klaus J, et al.: Missed opportunities: fewer service referrals after positive alcohol misuse screens in VA primary care. *Psychiatr Serv* 2011; 62:310–312 [PubMed: 21363905]
30. Tam CW, Zwar N, Markham R: Australian general practitioner perceptions of the detection and screening of at-risk drinking, and the role of the AUDIT-C: a qualitative study. *BMC Fam Pract* 2013; 14:121 [PubMed: 23961835]
31. Rehm J, Anderson P, Manthey J, et al.: Alcohol use disorders in primary health care: what do we know and where do we go? *Alcohol* 2016; 51:422–427
32. Glass JE, Bohnert KM, Brown RL: Alcohol screening and intervention among United States adults who attend ambulatory healthcare. *J Gen Intern Med* 2016; 31:739–745 [PubMed: 26862079]
33. Bradley KA, Bobb JF, Ludman EJ, et al.: Alcohol-related nurse care management in primary care: a randomized clinical trial. *JAMA Intern Med* 2018; 178:613–621 [PubMed: 29582088]
34. Bobb JF, Lee AK, Lapham GT, et al.: Evaluation of a pilot implementation to integrate alcohol-related care within primary care. *Int J Environ Res Public Health* 2017; 14:1030

HIGHLIGHTS

- Depression and alcohol use disorder are major contributors to disability and death across the globe.
- In a middle-income country, Colombia, which does not have a history of training primary care teams to address common mental disorders, it was feasible to implement technology-assisted screening and diagnosis of depression and alcohol use disorder into the routine workflow.
- Technology-supported screening and diagnosis greatly improved identification of depression and alcohol use disorder.
- In routine visits, primary care physicians appear to find it easier to diagnose depression than to diagnose alcohol use disorder after positive screens.

TABLE 1.

Screening results and diagnosis rates among 2,656 patients who were screened for depression, by study site

Variable ^a	Urban clinic (N=1,943)		Small-town clinic (N=713)		Combined (N=2,656)	
	N	%	N	%	N	%
PHQ-9 5	555	29	152	21	707	27
PHQ-9 10	250	13	62	9	312	12
Depression diagnosis	348	18	107	15	455	17
Joined study for depression ^b	181	9	68	10	249	9
Depression diagnosis among those with PHQ-9 5	348	63	107	70	455	64
Depression diagnosis among those with PHQ-9 10	180	72	49	79	229	73
Joined study for depression, among those diagnosed as having the disorder ^b	181	52	68	64	249	55

^aPossible scores on the nine-item Patient Health Questionnaire (PHQ-9) range from 0 to 27, with higher scores indicating more symptoms.

^bPatients who were diagnosed as having depression were invited to participate in a study that provides them with access to digital therapy for depression and tracks the course of their illness.

TABLE 2.

Screening results and diagnosis rates among 2,656 patients who were screened for alcohol use disorder, by study site

Variable ^a	Urban clinic (N=1,943)		Small-town clinic (N=713)		Combined (N=2,656)	
	N	%	N	%	N	%
AUDIT 8	113	6	37	5	150	6
Alcohol use disorder diagnosis	42	2	19	3	61	2
Joined study for alcohol use disorder ^b	20	1	14	2	34	1
Alcohol use disorder diagnosis, among those with AUDIT 8	38	34	19	51	57	38
Joined study for alcohol use disorder, among those diagnosed as having the disorder ^b	20	48	14	74	34	56

^aPossible scores on the Alcohol Use Disorders Identification Test (AUDIT) range from 0 to 40, with higher scores indicating more symptoms.

^bPatients who were diagnosed as having alcohol use disorder were invited to participate in a study that provides them with access to digital therapy for alcohol use disorder and tracks the course of their illness.

TABLE 3.

Results of screening and rate of diagnosis among 2,656 patients who were screened for depression and alcohol use disorder, by sex

Variable	Women (N=1,645; 62%)		Men (N=1,011; 38%)		p
	N	%	N	%	
Depression					
PHQ-9 10 ^a	220	13	92	9	<.01
Depression diagnosis	301	18	154	15	.04
Alcohol use disorder					
AUDIT 8 ^b	39	2	111	11	<.01
Alcohol use disorder diagnosis	16	1	45	5	<.01

^aPossible scores on the nine-item Patient Health Questionnaire (PHQ-9) range from 0 to 27, with higher scores indicating more symptoms.

^bPossible scores on the Alcohol Use Disorders Identification Test (AUDIT) range from 0 to 40, with higher scores indicating more symptoms.

TABLE 4.

Results of screening and rate of diagnosis among 2,656 patients who were screened for depression and alcohol use disorder, by age group

Variable	18–44 (N=982; 37%)		45 (N=1,674; 63%)		p
	N	%	N	%	
Depression	108	11	204	12	.36
PHQ-9 10 ^a					
Depression diagnosis	166	17	289	17	.81
Alcohol use disorder	103	11	47	3	<.01
AUDIT 8 ^b					
Alcohol use disorder diagnosis	47	5	14	1	<.01

^aPossible scores on the nine-item Patient Health Questionnaire (PHQ-9) range from 0 to 27, with higher scores indicating more symptoms.

^bPossible scores on the Alcohol Use Disorders Identification Test (AUDIT) range from 0 to 40, with higher scores indicating more symptoms.