Published in final edited form as:

J Am Geriatr Soc. 2011 February ; 59(2): 321–326. doi:10.1111/j.1532-5415.2010.03268.x.

Depression and Cognitive Impairment In Older Adult Emergency Department Patients: Changes Over Two Weeks

Manish N. Shah, MD MPH^{a,b,c}, Thomas M. Richardson, PhD MBA^{a,d}, Courtney M. C. Jones, MPH^{a,b}, Peter A. Swanson, BA^a, Sandra M. Schneider, MD^a, Paul Katz, MD^c, and Yeates Conwell, MD^d

^aDepartment of Emergency Medicine, University of Rochester Medical Center, Rochester, NY

^bDepartment of Community & Preventive Medicine, University of Rochester Medical Center, Rochester, NY

^cDepartment of Medicine, Division of Geriatrics and Aging, University of Rochester Medical Center, Rochester, NY

^dDepartment of Psychiatry, University of Rochester Medical Center, Rochester, NY

Abstract

Objectives—To evaluate older adult emergency department (ED) patients for depression and cognitive impairment, and compare those findings to re-evaluation 2-weeks later.

Design—Prospective cohort study.

Setting—Emergency department.

Participants—Community-dwelling older adult ED patients. 1206 patients consented to participate; 811 (67%) completed 2 week follow-up.

Measurements—Screening for depression (Patient Health Questionnaire-9) and cognitive impairment (Six Item Screener) was performed. Changes were evaluated through paired comparisons.

Results—1206 patients consented to participate; 811 (67%) completed 2 week follow-up. For depression, 27/97 (28%) with baseline positive tests remained positive on 2 week follow-up and 22/706 (3%) who initially tested negative were positive on follow-up. For cognitive impairment, 5/43 (12%) with baseline positive tests remained positive at 2 week follow-up and 11/765 (1%) who initially tested negative were positive at 2 week follow up.

Corresponding Author: Manish N. Shah, MD MPH, 601 Elmwood Avenue, Box 655, Rochester, NY 14642, 585-463-2920 (office), 585-463-2966 (fax), manish.shah@rochester.edu. Alternate Corresponding Author: Courtney M. C. Jones, MPH, Department of Emergency Medicine, University of Rochester Medical Center, 601 Elmwood Avenue, Box 655, Rochester, NY 14642, Phone: 585-463-2955, Fax: 585-463-2966, courtney_jones@urmc.rochester.edu.

This study was presented in abstract form at the Society for Academic Emergency Medicine, 2009 Annual Meeting in New Orleans, LA.

Author Contributions:

Dr. Shah—Developed the study, designed the study, analyzed data, interpreted data, and prepared the manuscript.

Dr. Richardson—Developed the study, designed the study, analyzed data, interpreted data, and prepared the manuscript.

Ms. Jones—Analyzed data, interpreted data, and prepared the manuscript.

Mr. Swanson—Developed the study, recruited subjects, interpreted data, and edited the manuscript.

Dr. Schneider—Developed the study, interpreted data, and edited the manuscript.

Dr. Katz—Developed the study, interpreted data, and edited the manuscript.

Dr. Conwell—Developed the study, interpreted data, and edited the manuscript.

Sponsor's Role: None.

Conclusions—Significant variability exists for depression and cognitive impairment testing completed during and after the ED visit, with markedly fewer subjects testing positive in follow-up. The variability may reflect changes in clinical state, confounding from other conditions, or poor validity of the instruments in the ED setting. Further studies are needed to explain these findings before case finding for these conditions is implemented in the ED setting.

Keywords

Emergency Care; Depression; Cognitive Impairment; Geriatrics; Prevention

INTRODUCTION

Primary care physicians (PCP) are asked to identify and address older adults' needs to promote their health, prevent disability, and maximize their quality of life.¹ Identifying patients with depression and cognitive impairment is of particular importance as these conditions are associated with significant disability, morbidity, mortality, and increased healthcare costs.^{2,3,4,5} While this system of evaluation and intervention by PCPs makes a great deal of sense, recent studies have shown that it is not uniformly implemented. Studies have shown that approximately one-half of depressed or demented older adults are not identified by their PCPs.^{6,7} Hypothesized reasons for this lack of direction and intervention are numerous, involving factors at the patient-level (e.g. perceived stigma), provider-level (e.g. lack of training), and service system-level (e.g. poor reimbursement, inadequate time).^{8,9}

Identifying needs in the emergency department (ED) is a potential alternate mechanism to assist older adults.^{1,10,11} Older adults in the US frequently use EDs, with 15 million ED visits in 2000.¹² This high frequency of ED use provides a tremendous opportunity to identify unrecognized conditions, such as depression or cognitive impairment, and refer for further diagnostic evaluation and intervention. Furthermore, emergency physician knowledge of the presence of these conditions may have implications to improve patients' emergency care. A recent paper has recommended that cognitive function evaluation become a quality indicator for geriatric ED care.¹³

Although identifying older adults with depression or cognitive impairment in the ED has potential, it must be rigorously evaluated prior to implementation. A few ED-based studies have evaluated the concurrent criterion validity of some tests for depression and cognitive impairment.^{14,15} To our knowledge, however, no studies have evaluated the persistence of depression or cognitive impairment symptoms after ED care. Significant improvement in symptoms after an ED visit would bring into question the utility of an ED-based case finding program for depression or cognitive impairment.

This study aimed to evaluate, among older adults, the presence of depression as determined by the Patient Health Questionnaire-9 (PHQ-9) in the ED and 2 weeks later. We hypothesized that we would find high rates of concordance for depression at the initial ED evaluation and at follow-up. This study further aimed to evaluate the presence of cognitive impairment as determined by the Six Item Screener (SIS) in the ED and 2 weeks later. We hypothesized that we would find high rates of concordance for cognitive impairment at the initial ED evaluation and at follow-up.

METHODS

Design

We performed a prospective cohort study of older adults (age $\geq$ 60) presenting to an academic medical center ED from May to July 2008. The institution's Research Subjects Review Board approved the conduct of this study for patients providing informed consent.

Setting

This study took place at the University of Rochester Medical Center (URMC) ED. The URMC is a 740-bed academic medical center that cares for approximately 95,000 ED patients annually.

Scales

We chose previously validated scales that could be practically and broadly implemented in the ED to evaluate for depression or cognitive impairment. For depression, we chose the PHQ-9 because it has been validated in primary care, has excellent test characteristics (sensitivity, specificity 88%), and is a valid measure of change in symptom severity over time.¹⁶ A symptom score greater than or equal to 10 was used to determine clinically significant depression. Telephone administration of the PHQ-9 has been validated.¹⁷ For cognitive impairment, we chose the SIS because it is simple to administer and score, does not require arm mobility for measurement of motor skills or eyeglasses for visuospatial skills (often limited in the ED), has been validated in primary care, and has excellent test characteristics.¹⁸ Greater than two errors on the instrument was considered positive for cognitive impairment to maximize specificity (97%) while accepting a slightly lower sensitivity (50%).¹⁸

We evaluated delirium and anxiety, important potential comorbid conditions, with the Confusion Assessment Method¹⁹ and GAD-7, respectively.²⁰ The Confusion Assessment Method is a validated and widely accepted measure to evaluate for delirium, including in the ED.²¹ For anxiety, we chose the GAD-7 because it is easy to use, easy to score, and has been validated in primary care.²² Patients with a score greater than or equal to 10 were considered to have clinically significant anxiety.

These scales were integrated into an interview and chart abstraction form that also included demographic data. Explicit chart abstraction instructions allowed for standardized data collection. The interview and chart abstraction form was tested and revised in an iterative fashion to improve usability and efficiency. Study staff was trained in the use of these scales and the interview and chart abstraction form by the primary investigators and/or the lead project coordinator. Those individuals also observed staff members complete interviews before they independently enrolled and screened subjects.

Protocol

Study staff was present in the ED seven days a week from 8am to 11pm. They were instructed to enroll all eligible subjects present during these hours even if they arrived outside those hours. Older adults who arrived at the ED and were discharged during the overnight hours, however, were likely missed. Subjects were eligible if they were age 60 years or older and had presented for care to the ED. Subjects were excluded if they were institutionalized, did not speak English, could not interact with the study staff, or lacked decisional capacity and an authorized representative to consent. Subjects could be included multiple times during the study period, but each enrollment would result in a separate 2 week follow-up.

Study staff identified eligible patients and, after obtaining consent, completed the interview with the scales described. Although some demographic and clinical information was obtained via chart review, most, including marital status, race, ethnicity, education, and living arrangement was obtained via self-report. Specifically related to depression, patients were asked if they had a history of depression and the ED medical record was reviewed for any notation regarding depression. Related to cognitive impairment, patients were asked if they had a history of “dementia” or took medications for “memory problems.” The term “cognitive impairment” was not used with patients since we felt that some would not understand its meaning. The ED medical record was reviewed for any notation regarding cognitive impairment (including dementia). If either the patient self-report or the medical record indicated the presence of depression or cognitive impairment, then the condition was considered present.

After completion of the ED survey, subjects were asked to participate in a follow-up telephone survey 2 weeks later. If subjects were hospitalized or in a skilled nursing facility at that time, they were considered lost to follow-up and not interviewed because we did not believe that results from subjects at home could be compared to those who were institutionalized (nursing facility or hospital). Protocol dictated that subjects were called on the day follow-up was indicated, and if the subject was unable to complete follow up at that time, they were then called 1 day, 3 days, 5 days, 1 week, and 2 weeks later. Those unable to be reached were considered lost to follow-up. Study staff was given flexibility to alter this protocol based on information available regarding each case. For example, some participants asked to be called back at times outside of the protocol days.

Data Analysis

Data were analyzed using Stata 8.0. Descriptive statistics were calculated to characterize the participating individuals. Changes in depression or cognitive impairment symptoms were evaluated through paired comparisons of the dichotomous results (with or without the condition) within individuals (i.e., ED vs. 2 weeks). McNemar’s test was used to compare the results. A p-value <0.05 defined statistical significance.

RESULTS

Of the 2053 eligible subjects approached, 1206 (58%) consented, completed the ED survey, and agreed to the 2 week follow up. Reasons for attrition included patient refusal to complete the ED survey (475), refusal to participate in follow-up (216), inability to consent (81), and refusal due to previous participation (75). In the ED, 46 individuals consented to participate twice and 3 individuals consented to participate 3 times. We obtained 2 week follow-up on 811 (67%). Reasons for attrition during the follow-up telephone call included refusal to complete the survey (204), current hospitalization or admission to a skilled nursing facility (112), inability to contact (54), and death (25).

Table 1 shows the baseline characteristics of individuals who completed the evaluation in the ED. Of interest, we had relatively few individuals with delirium participate in this study. However, a significant proportion of individual tested positive for depression (15%), cognitive impairment (9%), and anxiety (10%).

Of the participants testing positive for depression in the ED, 93/177 (53%) reported no prior history and 118/204 (58%) of participants with a prior history of depression tested negative. Similarly, of those testing positive for cognitive impairment in the ED, 91/106 (86%) reported no previous history and 91/106 (86%) reported no medications for “memory problems”. Normal SIS results were obtained in 22/37 (59%) reporting a prior history of dementia and 15/26 (58%) reporting taking medications for “memory problems”.

Table 2 shows the changes in depressive symptoms and cognitive impairment between the ED visit and 2 week follow up. For both conditions, we found that individuals testing negative in the ED generally tested negative at 2 weeks later (>95%, both conditions). However, for both conditions the vast majority of subjects that tested positive in the ED tested negative 2 weeks later (depression: 28%, $p<0.01$; cognitive impairment 12%, $p<0.01$). On 2 week follow up we also found that only 29/805 (4%) were anxious on the GAD-7, a decrease from 10% in the ED (Table 1).

Figure 1 describes the raw score fluctuation for the PHQ-9 and SIS. Small fluctuations may cause individuals to switch between being identified with and without the condition. Most of the fluctuation is to the left of 0 (negative values), indicating a reduction in depressive symptoms on the PHQ-9 and number of errors on the SIS. As demonstrated in the figure, the magnitude of change is small.

DISCUSSION

Routine testing during ED care may identify many individuals with depression or cognitive impairment because a large number of older adults receive ED care. In this study, we confirmed that older adults in the ED frequently test positive for depression or cognitive impairment. Furthermore, we found that a large proportion of these individuals had not been previously diagnosed with these conditions.

The presence of depression and cognitive impairment among ED patients should be important to the emergency physician. This knowledge may decrease the trust placed in the patient-reported history of illness and help with discharge planning, such as the ability of the patient to remember and follow instructions. Additionally, it may indicate the presence of a disease process that had not previously been identified (e.g. delirium caused by infection) or an unsafe home situation. Assuming test validity, the presence of depression or cognitive impairment is critical.

Surprisingly, we found that the depression or cognitive impairment did not persist during re-evaluation 2 weeks later. We did not expect that the vast majority of individuals who tested positive for depression or cognitive impairment would test negative at 2 weeks (72% and 88% respectively). The magnitude of the change is greater than two comparable studies that evaluated mood variability in patients of all ages with congestive heart failure admitted to the hospital.^{23,24} The first study found that for patients with minor depression, full remission was seen in 64% of patients within 3 months, with an average time to remission of 5.4 weeks. For those with major depression, 48% remitted within 6 months, with an average time of 11.7 weeks. The second study found that 55% of patients remitted within 1 month and 75% within 6 months. To our knowledge, no studies have examined cognitive impairment in the ED and shortly after ED visits; thus, we lack comparative data.

A number of potential explanations exist for this variability in depression and cognitive impairment. It could have resulted from a change in the patients' clinical state, as hypothesized in the studies of depressed patients with congestive heart failure admitted to the hospital.^{23,24,25} Patients may have more accurately reported true symptoms while feeling vulnerable during the acute illness, and then not admitted to the symptoms on follow up. Alternatively, these changes could have reflected confounding from other conditions. Delirium could have been present in the ED and resulted in a positive SIS, and resolved by follow up. However, only 3 subjects in this study were delirious in the ED, making this an unlikely explanation. Anxiety could have served as a confounder for the depression results. We were unable to evaluate this potential explanation due to the small numbers of depressed

subjects who were anxious. The acute disease process could also have had an impact, but our sample size was not large enough to undertake such an analysis.

The variability identified in this study resulted from a small change in scoring of the tests (Figure 1). It is possible that this change is merely variation intrinsic to these instruments rather than a true change in clinical state. Alternatively, the test may have been invalid because neither of these instruments have been validated for ED use and the specific scoring cut-points that differentiate individuals with and without these conditions have never been identified for use in the ED. Studies have compared the SIS to the Mini-Cog or Mini-Mental State Exam in the ED with reasonable performance, but no rigorous validation study has been done.^{26,27} To our knowledge, no studies have evaluated the PHQ-9 in the ED.

The variability identified may also relate to methodological issues in this study. Follow-up interviews were done by telephone rather than in-person. The PHQ-9 has been shown to be valid and reliable, and yields comparable results when administered by either means.¹⁷ However, the SIS has not been evaluated. One can theorize that during telephone follow-up patients may have experienced fewer surrounding distractions and thus performed better.

These many reasons question the validity and meaning of testing positive for depression or cognitive impairment in the ED and the utility of ED-based case finding. However, the variability may be indicative of vulnerability to future depression and/or cognitive decline and so may serve as a prognostic indicator.²⁸ To our knowledge, no studies have evaluated the long-term prognostic meaning of the variability of depression or cognitive impairment around the stress of ED care. One intriguing possibility is that the variability results from unmasking sub-clinical disease through the acute demands on physiological, emotional, and cognitive reserves, indicating vulnerability to the subsequent development of major depression or dementia. Only one study has looked at the variability of depression, as categorized by the Geriatric Depression Scale, in an outpatient setting. It found that variability in depression predicts cognitive decline. The authors hypothesized that mood variability may result from brain damage early in the course of dementia.²⁸ Literature does exist associating variability in cognitive testing with a longitudinal decline in cognitive abilities.^{29,30} While our study cannot clarify the reasons for variability, we believe further research is needed to explore the meaning this variability as a prognostic indicator for mood and cognitive difficulties.

Limitations

These findings must be considered in the context of our study's limitations. Although the retention rate is good, a large proportion of subjects with depression and cognitive impairment (Table 1, 2) were lost to follow-up, potentially impacting our findings. If these subjects had been followed up, the magnitude of the variability may have been reduced. Second, fluctuation of scores of just a few points caused individuals to move between screening positive for the conditions and screening negative. The clinical meaning of this change is unclear, particularly in the ED setting, and needs further investigation. The ED visit may have heightened patients symptoms, putting them beyond the threshold for a positive test. But, when feeling better, they may have reverted to a subsyndromal depression (score 5–10) that may still be important to recognize. Third, because the study was performed at one center, generalizability must be considered. Fourth, the validity of these instruments and the scoring scheme developed in the primary care office setting have not been evaluated in the emergency care setting. Our findings may merely result from invalid instruments or scoring schemes. Finally, the prognostic value of the variability has not been evaluated, and is a potentially important question for future research.

CONCLUSION

Although older adults commonly test positive for depression or cognitive impairment during an ED visit, repeat screening 2 weeks later found markedly fewer subjects with depression or cognitive impairment. Reasons for this variability are numerous and may reflect changes in clinical state, confounding from other conditions, and invalid screening instruments for use in the ED setting. Further studies need to be performed to explain these findings and evaluate the meaning of variability as a prognostic indicator before screening for these conditions is widely implemented in the ED setting.

Acknowledgments

Dr. Shah was supported by the Paul B. Beeson Career Development Award (NIA 1K23AG028942).

Dr. Conwell was partially supported by NIH grant R24 MH071604.

Dr. Richardson was partially supported by the US Department of Veteran's Administration Center of Excellence Canandaigua, NY

REFERENCES

1. US Department of Health and Human Services. 2nd ed. Washington, DC: U. S. Government Printing Office; 2000 November. Healthy People 2010: Understanding and Improving Health.
2. Unutzer J, Patrick DL, Simon G, et al. Depressive symptoms and the cost of health services in HMO patients aged 65 years and older. *JAMA*. 1997; 277:1618–1623. [PubMed: 9168292]
3. Callahan CM, Hui SL, Nienaber NA, et al. Longitudinal study of depression and health services use among elderly primary care patients. *J Am Geriatr Soc*. 1994; 42:833–838. [PubMed: 8046192]
4. Zhao Y, Kuo TC, Weir S, et al. Healthcare costs and utilization for Medicare beneficiaries with Alzheimer's. *BMC Health Serv Res*. 2008; 8:108. doi:10.1186/1472-6963-8-108. [PubMed: 18498638]
5. Witthaus E, Ott A, Barendregt JJ, Breteler M, Bonneux L. Burden of mortality and morbidity from dementia. *Alzheimer Dis Assoc Disord*. 1999; 13:176–181. [PubMed: 10485578]
6. Unutzer J, Katon W, Callahan CM, et al. Depression in a sample of 1801 depressed older adults in primary care. *J Am Geriatr Soc*. 2003; 51:505–514. [PubMed: 12657070]
7. Callahan CM, Hendrie HC, Tierney WM. Documentation and evaluation of cognitive impairment in elderly primary care patients. *Ann Intern Med*. 1995; 122:422–429. [PubMed: 7856990]
8. Yarnall KSH, Pollack KI, Ostbye T, et al. Primary care: Is there enough time for prevention? *Am J Public Health*. 2003; 93:635–641. [PubMed: 12660210]
9. Frame PS. Health maintenance in clinical practice: strategies and barriers. *Am Fam Phys*. 1992; 45:1192–1200.
10. Delbridge TR, Bailey B, Chew JL Jr, et al. EMS agenda for the future: where we are ... where we want to be. EMS Agenda for the Future Steering Committee. *Ann Emerg Med*. 1998; 31(2):251–263. [PubMed: 9472190]
11. National Highway Transport Safety Administration / Health Resources & Services Administration. Washington, DC: 1996. EMS Agenda for the Future.
12. Shah MN, Bazarian JJ, Lerner EB, Fairbanks RJ, Barker W, Auinger P, Friedman B. The epidemiology of emergency medical services use by older adults: an analysis of the National Hospital Ambulatory Medical Care Survey. *Academic Emergency Medicine*. 2007; 14:441–447. [PubMed: 17456555]
13. Terrell KM, Hustey FM, Hwang U, et al. Quality indicators for Geriatric Emergency Care. *Acad Emerg Med*. 2009; 16:441–449. [PubMed: 19344452]
14. Meldon SW, Emerman CL, Schubert DSP. Recognition of depression in geriatric ED patients by emergency physicians. *Ann Emerg Med*. 1997; 30:442–447. [PubMed: 9326858]
15. Wilber ST, Carpenter CR, Hustey FM. The Six-item screener to detect cognitive impairment in older emergency department patients. *Acad Emerg Med*. 2008; 15:613–616. [PubMed: 18691212]

16. 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]
17. Pinto-Meza A, Serrano-Blanco A, Penarrubia MT, et al. Assessing depression in primary care with the PHQ-9: can it be carried out over the telephone? *J Gen Intern Med.* 2005; 20(8):738–742. [PubMed: 16050884]
18. Callahan CM, Wnverzagt FW, Hui SL, et al. Six-item screener to identify cognitive impairment among potential subjects for clinical research. *Med Care.* 2002; 40:771–781. [PubMed: 12218768]
19. Inouye SK, van Dyck CH, Alessi CA, et al. Clarifying confusion: the Confusion Assessment Method. *Ann Intern Med.* 1990; 113:9410948.
20. Spitzer RL, Kroenke K, Williams JB, et al. A brief measure for assessing generalized anxiety disorder: the GAD-7. *Arch Intern Med.* 2006; 166(10):1092–1097. [PubMed: 16717171]
21. Lewis L, Miller D, Morley J, et al. Unrecognized delirium in ED geriatric patients. *Am J Emerg Med.* 1995; 13:142–145. [PubMed: 7893295]
22. Spitzer RL, Kroenke K, Williams JBW, Lowe B. A brief measure for assessing generalized anxiety disorder. *Arch Intern Med.* 2006; 166(10):1092–1097. [PubMed: 16717171]
23. Koenig HG. Depression outcome in inpatients with congestive heart failure. *Arch Intern Med.* 2006; 166:991–996. [PubMed: 16682572]
24. Fulop G, Strain JJ, Stettin G. congestive heart failure and depression in older adults: clinical course and health services use 6 months after hospitalization. *Psychosomatics.* 2003; 44:367–373. [PubMed: 12954910]
25. Koenig HG, Johnson JL, Peterson BL. Major depression and physical illness trajectories in heart failure and pulmonary disease. *J Nerv Ment Dis.* 2006; 194:909–916. [PubMed: 17164629]
26. Wilber ST, Carpenter CR, Hustey FM. The Six-Item Screener to detect cognitive impairment in older emergency department patients. *Acad Emerg Med.* 2008; 15:613–616. [PubMed: 18691212]
27. Wilber ST, Lofgren SD, Mager TG. An evaluation of two screening tools for cognitive impairment in older emergency department patients. *Ann Emerg Med.* 2005; 12:612–616.
28. Rovner BW, Casten RJ, Leiby BE. Variability in depressive symptoms predicts cognitive decline in age-related macular degeneration. *Am J Geriatr Psychiatry.* 2009; 17:574–581. [PubMed: 19554672]
29. Hultsch DF, MacDonald SWS, Hunter MA, et al. Intraindividual variability in cognitive performance in older adults: Comparison of adults with mild dementia, adults with arthritis, and healthy adults. *Neuropsychology.* 2000; 14:588–598. [PubMed: 11055261]
30. Allaire JC, Marsiske M. Intraindividual variability may not always indicate vulnerability in elders' cognitive performance. *Psychology and Aging.* 2005; 20:390–401. [PubMed: 16248699]

Figure 1. Change of the PHQ-9 and Six Item Screener Scores Between the ED and 2 Week Follow Up

Negative values indicate a decrease in PHQ-9 or Six Item Screener scores between the ED evaluation and follow up.

Table 1

Characteristics of Participating Subjects

Characteristic	Value (N=1206) N (%)
Age, years (median, IQR)	71 (65, 8)
Gender, Female	634 (53%)
Race	
White	1000 (83%)
Black	178 (15%)
Other / Unknown / No Answer	17 (2%)
Ethnicity	
Hispanic	9 (1%)
Not Hispanic	1184 (98%)
Unknown / No Answer	13 (1%)
Current Marital Status	
Single (Never married, widowed, separated, divorced)	567 (47%)
Married	632 (52%)
Unknown / No Answer	7 (1%)
Education	
>High School Diploma	519 (51%)
High School Diploma or Less	581 (48%)
Unknown / No Answer	6 (0.5%)
History of:	
Depression	204 (17%)
Dementia	37 (3%)
Chief Complaint:	
Cardiovascular	242 (20%)
Gastrointestinal (includes abdominal pain)	196 (16%)
Muscular/skeletal (non-fall)	110 (9%)
Respiratory	99 (8%)
General Illness / Possible Infection	98 (8%)
Fall	73 (6%)
Neurological	75 (6%)
Pain	56 (5%)
Dizzy / Near-syncope / Syncope	80 (7%)
Other	177 (15%)
Disposition from ED:	
Discharged Home	367 (30%)
Admitted, ED Observation	389 (32%)
Admitted, Inpatient Unit	406 (34%)
Admitted, Intensive Care Unit	34 (3%)

Characteristic	Value (N=1206) N (%)
Other	10 (1%)
Delirium (Confusion Assessment Method):	
Delirious	3 (0.2%)
Incomplete Testing	3 (0.2%)
Anxiety (GAD-7)	
Anxious, ≥ 10 points	119 (10%)
Incomplete Testing	4 (0.3%)
Depression (PHQ-9)	
Depressed, ≥ 10 points	177 (15%)
Incomplete Testing	7 (0.6%)
Cognitive Impairment (Six Item Screener)	
Impaired, >2 errors	106 (9%)
Incomplete Testing	1 (0.1%)

Table 2

Changes in Depression and Cognition Results Between the ED and 2 Week Follow Up

		Two Week Follow Up		
		Positive N (% , 95% CI)	Negative N (% , 95% CI)	Total (N)
ED	Depression *			
	Positive	27 (28%, 19–38%)	70 (72%, 62–81%)	97
	Negative	22 (3%, 2–5%)	684 (97%, 95–98%)	706
	Total	49	754	803
	Cognitive Impairment *			
	Positive	5 (12%, 4–25%)	38 (88%, 75–96%)	43
	Negative	11 (1%, 0.7–2.6%)	754 (99%, 75–96%)	765
	Total	16	792	808

Note: Due to incomplete survey responses on the PHQ-9 and/or Six Item Screener, the sample size for the follow-up does not add to 811.

* P<0.01