Article

American College of Medical Quality | ACMQ

American Journal of Medical Quality
1–8

DOI: 10.1177/1062860615577131
ajmq.sagepub.com
SAGE

Population-Level Quality Measures for Behavioral Screening and Intervention

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Abstract

Delivered routinely in general health care settings, smoking, alcohol, depression, and obesity screening and intervention (behavioral screening and intervention [BSI]) could substantially improve population health and reduce health care costs. Yet BSI is seldom delivered in an evidence-based manner. This article assesses the adequacy of quality measures for BSI. Online searches of the National Quality Forum's Quality Positioning System and the National Clearinghouse for Quality Measures databases were conducted using the keywords *smoking, tobacco, alcohol, depression*, and *obesity*. The types and focuses of each measure were classified, and differences between the metrics and evidence-based practice were identified. Most measures indicate whether BSI components are delivered, not how well. Clinicians can perform well on most metrics without delivering evidence-based services. More rigorous quality measures are needed. A new kind of measure is proposed, whereby separate terms representing the reach and effectiveness of key BSI components are multiplied to produce a single indicator of population-level impact for each behavioral topic.

Keywords

behavioral medicine, mass screening, outcome assessment, primary care

Few primary care settings systematically deliver evidence-based, cost-saving behavioral screening and intervention (BSI)[1-4] despite the substantial health and economic impacts of behavioral risks and disorders, long-standing recommendations from many authorities, and increasingly available quality measures. The behavioral factors causing the highest morbidity and mortality are smoking, unhealthy drinking, depression, and obesity.

Impact of Behavioral Risk Factors

Behavioral risks and disorders are responsible for 40% of deaths,[5] most chronic disease,[6] and more than $900 billion of health care and other costs in the United States.[7-11] Table 1 lists the prevalence and some impacts of smoking, risky drinking, depression, and obesity. Smoking is the leading preventable cause of death and the most important risk factor for cardiovascular disease, chronic lung disease, and many cancers.[7] Risky drinking—more than 4 standard drinks on a single occasion or 14 drinks per week for men or more than 3 drinks on a single occasion or 7 drinks per week for women[30]—leads to many injuries and deaths, especially among young people.[18] Depression is a major cause of disability and causes many deaths through suicide and impaired self-management of other chronic diseases.[24] Affecting more than one third of American adults and contributing substantially to racial and ethnic health disparities, obesity poses risk for diabetes, cardiovascular disease, and several cancers.[28] Clearly, the frequency and magnitude of the negative impacts of behavioral issues demand that health care providers address them proactively with a population health approach,[31] whereby BSI is systematically delivered to all patients.

Behavioral Screening and Intervention

The first step of BSI is universal screening, consisting of one question on smoking,[14] one on alcohol use,[30] 2 on depression symptoms,[32] and a body mass index determination. For alcohol and depression, positive screens should prompt brief validated assessments, such as the

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Table 1. Influence of Behavioral Health Issues for Which Effective Screening and Interventions Are Available.

	Smoking	Risky Drinking	Depression	Obesity
Prevalence, ages 18 and older	20% to 24%[12,13]	17% to 25%[16,17]	7%[22]	36%[28]
Health impacts	Leading preventable cause of death[7]	88 000 Deaths per year, 30 years of potential life lost per death[18]	Major cause of disability,[23] suicide, and poor self-management of chronic diseases[24]	Risk for cardiovascular disease, diabetes, and cancer[28]
Health care costs	$133 Billion[7]	$25 Billion[8]	$26 Billion[9]	$147 Billion[10]
Other costs	$156 Billion[7]	$199 Billion[8]	$57 Billion[9]	$73 Billion[11]
Health impacts of evidence-based BSI	Screening and optimal interventions increase one-year quit rates from 3% to 28%[14]	Brief alcohol interventions reduce unhealthy drinking by 20%, injuries by 33%, emergency department visits by 20%, and hospital admissions by 37%[19]	Collaborative care increases the odds of remission by 75% at one year[25]; behavioral activation prevents progression of minor depression[26]	Structured programs attain sustained weight loss of 9-15 lb and clinically significant reductions in blood pressure, blood glucose, and LDL[29]
Economic impacts of BSI	Third leading preventive service in favorable health and cost impacts[15]	$523 Health care savings in one year for primary care patients[20] and $4392 for disabled Medicaid patients[21]; fourth leading preventive service in health and cost impacts[15]	A $522 investment generates $3363 net savings per patient over 4 years[27]	No known ROI

Abbreviations: BSI, behavioral screening and intervention; LDL, low-density lipoprotein; ROI, return on investment.

Alcohol Use Disorders Identification Test[33] and the Patient Health Questionnaire-9.[34]

As shown in Table 1, robust smoking cessation interventions—involving motivational interviewing, pharmacotherapy, and more than 8 one-on-one support sessions—substantially increase one-year quit rates.[14,35] Among nondependent risky and problem drinkers, brief alcohol interventions reduce binge drinking, injuries, emergency department visits, hospital admissions, arrests, and motor vehicle crashes.[19] Depression screening, which the US Preventive Services Task Force recommends only when "staff-assisted depression care supports are in place to assure accurate diagnosis, effective treatment, and follow-up,"[29] overcomes most of the 30% to 50% underdiagnosis of depression.[36] Collaborative care, the most effective set of staff-assisted care supports, increases remission and reduces net health care costs.[25,27] On average, obese individuals who participate for 6 to 12 months in intensive, structured programs sustain weight loss and manifest clinically significant reductions in other health-related risk factors.[29]

Although obesity interventions have not been shown to generate economic return on investment, BSI for the other behavioral issues does reduce health care expenditures. Cost savings from smoking interventions are difficult to assess because most savings accrue years later when cardiovascular disease, lung disease, and cancers are averted. Nevertheless, experts have concluded that smoking and alcohol screening and intervention improve outcomes and reduce costs more than screening for hypertension, diabetes, lipid disorders, and various cancers.[15] Depression screening and collaborative care also generate health care cost savings.[27]

Barriers to BSI

One barrier—inadequate reimbursement—has been partially addressed. The Affordable Care Act requires that payers in exchanges reimburse for services that carry grade A or B recommendations from the US Preventive Services Task Force, including BSI, without out-of-pocket payments by patients. Medicare has established new billing codes for these services, except for collaborative care. Medicaid programs are encouraged but not required to reimburse for these services. Another barrier is training. Few clinicians have been well trained to deliver robust interventions for behavioral risks and disorders.[4,37,38]

The most pervasive barrier may be time. Given the population prevalence of these risks and disorders, primary care providers who spend only 5 minutes on each issue revealed by routine screening would extend each workday by 2 hours.[39] Because of the need for our overstretched primary care workforce to provide diagnostic and treatment services for growing numbers of elderly and insured patients, a solution that is increasingly

recommended is to delegate preventive services to other health care team members.[39-42]

Potential Approaches to BSI Provision

A Wisconsin-based program that expanded teams to deliver BSI in 33 diverse health care settings demonstrated high patient satisfaction and substantial improvements in behavioral outcomes. In this program, specially trained bachelor's-level paraprofessionals obtained better outcomes than identically trained master's-level counselors and social workers.[43] A barrier to disseminating such programs is that Medicare and some commercial health plans do not reimburse when noncredentialed providers deliver BSI. Even if reimbursement gaps are closed, the low reimbursement rates may not be sufficient incentive for providers to expand their health care teams to deliver systematic BSI.

One way to spread high-quality BSI would be to establish financial incentives for excelling on quality measures. Dozens of such measures have been developed over the past several years. Ideally, such measures should reflect the reach and effectiveness of BSI (ie, the proportion of patients receiving services and the quality of those services). In this article, current quality metrics for each behavioral topic are enumerated, and substantial gaps between the metrics and evidence-based practice are identified. Then, a new kind of composite quality measure, which reflects the population health impact of BSI as administered in clinical settings, is proposed, and implementation issues are discussed.

Methods

In September 2014, the authors conducted quality measure searches using 2 online sources. One source, the Quality Positioning System[44] has been operated by the National Quality Forum (NQF) since 2012. Entries are updated annually or on notification of changes by measure stewards. The other source, the Agency for Healthcare Research and Quality's National Clearinghouse for Quality Measures database,[45] has been administered and updated quarterly by the ECRI Institute since its inception in 2011.

The keywords *smoking, tobacco, alcohol, obesity*, and *depression* were used as search terms. Measures were eligible for inclusion if they were intended for general adult patient populations treated in ambulatory or inpatient health care settings. Eligibility also required either NQF endorsement or development by an entity serving as a steward for least one NQF-endorsed measure. These criteria were intended to identify current measures or possible future measures with strong validity and credibility. When multiple versions of measures were found, only the latest versions were included.

All eligible measures were categorized as pertaining to service delivery (whether or how a service was delivered), patient engagement (the extent of patient participation in their care), or behavioral outcomes (the severity of behavioral risks or disorders). Measures pertaining to service delivery or patient engagement were subcategorized with regard to the components of BSI that they assess: screening and/or assessment, assessment accuracy, intervention, referral, pharmacotherapy, and/or follow-up.

The authors each conducted categorization and subcategorization independently. There was initial agreement on categorization for all metrics. Initial disagreement on subcategorization for 4 of 38 metrics was easily resolved after minimal discussion.

Results

Supplemental online Table 1A (available at http://ajmq.sagepub.com/supplemental) lists the 38 quality measures that met inclusion criteria. As shown in Table 2, there are 11 measures pertaining to smoking, 10 to alcohol, 14 to depression, and 3 to obesity. There are 53 focuses across the 38 measures because some measures have more than one focus.

Of the 53 focuses, 43 pertain to service delivery, including all 16 focuses of the smoking metrics, 12 of 13 focuses of the alcohol metrics, and all 3 focuses of the obesity metrics. For smoking and alcohol, the metrics focus on delivery of screening, diagnostic assessment, interventions such as advice or recommendations regarding behavior change or pharmacotherapy, referrals, and reassessment at a follow-up encounter. For obesity, all 3 metrics focus on body mass index determination, and one also requires documentation but not implementation of a clinical management plan. The depression metrics are more diverse because only 12 of 21 focuses pertain to service delivery. The depression metrics' service delivery focuses are similar to those for smoking and alcohol, except that none focus on screening. Across all 4 behavioral topics, all but one of the service delivery metrics reflect whether services are delivered to appropriate patients, not how or how well. The exception was one metric reflecting accuracy of diagnostic assessment for depression.

Of the 53 focuses, 6 pertain to patient engagement—one on alcohol and 5 on depression. The single alcohol metric on patient engagement reflects the effectiveness of referrals of alcohol-dependent patients to specialized treatment. Of the 5 depression metrics on patient engagement, 4 reflect continuance of pharmacotherapy over 12 weeks to 6 months, and one reflects whether follow-up visits occurred. None of the measures for smoking, alcohol, or obesity focus on behavioral outcomes.

Table 2. Current Quality Measures for Adult Behavioral Screening Intervention and Their Focuses.[a]

	Tobacco	Alcohol	Depression	Obesity	Totals
Total number of quality metrics	11	10	14	3	38
Metrics focusing on service delivery					
Screening and/or assessment	3	3	5	3	14
Assessment accuracy	0	0	1	0	1
Intervention	5	4	1	0	10
Pharmacotherapy	5	2	1	0	8
Referral	2	2	1	0	5
Follow-up	1	1	3	0	5
Subtotal	16	12	12	3	43
Metrics focusing on patient engagement					
Screening and/or assessment	0	0	0	0	0
Intervention	0	0	0	0	0
Pharmacotherapy	0	0	4	0	4
Referral	0	1	0	0	1
Follow-up	0	0	1	0	1
Subtotal	0	1	5	0	6
Metrics focusing on behavioral outcomes	0	0	4	0	4
Total number of focuses	16	13	21	3	53

[a]This table summarizes the information shown in online supplemental Table 1A, available at http://ajmq.sagepub.com/supplemental. The number of focuses in this table exceeds the number of metrics in Table 1A because some metrics have more than one focus.

Only 4 of the 53 focuses pertain to behavioral outcomes. All 4 reflect improvements in or resolution of depression symptoms at 6 or 12 months, and all are sponsored by an organization operating in one state—Minnesota Community Measurement. There are no outcome measures for smoking, alcohol, or obesity.

In summary, more than 80% of the focuses of the 38 measures, including all measures for smoking and obesity, pertain to whether services are delivered and not how or how well. Measures on depression screening are lacking. The single patient engagement measure for alcohol focuses only on alcohol-dependent individuals. The only measures pertaining to behavioral outcomes concern depression, and these measures are sponsored by a statewide organization, not a national one. Thus, health care professionals can perform well on most BSI quality metrics without delivering robust, evidence-based BSI with the fidelity necessary to attain better health and lower health care costs.

Discussion

The main finding of this analysis is that the current pool of BSI quality metrics is inadequate because the metrics can be satisfied merely by conducting screens and assessments and by delivering interventions and other clinical services with poor fidelity to evidence-based methods. The exceptions are 4 metrics for depression symptom outcomes and a metric for the effectiveness of referral for alcohol treatment, which does not apply to 90% of individuals who drink excessively because they are not alcohol dependent and are candidates for brief interventions.[46] Another important deficiency is the lack of a metric for depression screening.

Desirable Attributes of Quality Measures for BSI

Quality measures should indicate the extent to which various components of BSI are delivered to eligible patients. Such measures exist for smoking, alcohol, and obesity screening and assessment, but a screening metric is lacking for depression. Measures are lacking on the proportion of eligible patients who receive interventions for obesity and collaborative care for depression.

BSI quality measures also should indicate how well BSI is delivered. They should reflect the extent to which screening and assessment are effective in identifying patients with risks and disorders. How such screens and assessments are administered is important because fear of harsh judgment or breaches in confidentiality can hinder accurate patient response to sensitive questions.[47] Questions on patients' perceptions of screening and assessment delivery could be added to current patient satisfaction questionnaires.

BSI quality metrics also should reflect the quality of interventions, referrals, pharmacotherapy, and follow-up. Because it would be difficult to design adequate and convenient process measures, the quality of such services

Table 3. Description of Variables in Proposed Quality Measure and Sources of Data.

Variable	Description	Source of Data
Q	The calculated quality measure	
S_{deliv}	The number of patients to whom screening was delivered, of those who were eligible	EHR field
S_{elig}	The number of patients eligible for screening	Derived from EHR fields
A_{deliv}	The number of patients to whom assessments were delivered, of those who were eligible	EHR field
A_{elig}	The number of patients eligible for assessment = the number of patients with a positive screen	EHR field
R_{actual}	The actual proportion of patients determined to be at risk	Screening and assessment results
$R_{expected}$	The minimum proportion of patients expected to be identified as at risk	Population-based surveys
I_{deliv}	The number of patients to whom interventions were delivered of those who were eligible	EHR field
ΔB_{actual}	The proportion of patients who actually attained desirable behavioral outcomes	EHR field
$\Delta B_{expected}$	The minimum proportion of patients expected to attain desired behavioral outcomes	Prior research

Abbreviation: EHR, electronic health record.

would best be gauged by outcome measures. Such measures could be obtained at low cost through "meaningful use" of electronic health records. Possible outcome measures could be average daily cigarette use in the prior 7 days,[48] days of unhealthy drinking in the past 4 weeks,[49] depression symptom scores,[34] and body mass index.

Structural quality measures could be constructed to promote team-based delivery of BSI. There is increasing consensus that primary care clinicians lack the time and are not the appropriate individuals to deliver preventive services, especially because of our nation's primary care clinician shortage.[39-42] A variety of professionals and paraprofessionals are capable of delivering BSI,[14,20,21,25,27,39,42,43,50] and structural quality measures could indicate whether health care teams have been expanded sufficiently to deliver robust, evidence-based services.

Proposed Population-Level Quality Measures for BSI

The previous suggestions would yield an unwieldy array of quality measures for each behavioral issue. To provide a single quality measure for each issue, which could serve as a basis for financial incentives, a composite measure reflecting population health impact is proposed:

$$Q = \frac{S_{\text{deliv}}}{S_{\text{elig}}} \times \frac{A_{\text{deliv}}}{A_{\text{elig}}} \times \frac{R_{\text{actual}}}{R_{\text{expected}}} \times \frac{I_{\text{deliv}}}{R_{\text{actual}}} \times \frac{\Delta B_{\text{actual}}}{\Delta B_{\text{expected}}}.$$

Table 3 describes the variables in the above equation and their sources of data after "meaningful use" of electronic health records is implemented for BSI.

The first term, S_{deliv}/S_{elig}, reflects the proportion of eligible patients who complete screens. The second term, A_{deliv}/A_{elig}, reflects the proportion of patients with positive screens who complete appropriate assessment. For both terms, the highest value of 1 is obtained when all eligible patients complete screens and assessments. Because screening identifies smoking and obesity, the second term would be omitted for these topics.

The third term, $R_{actual}/R_{expected}$, indicates the effectiveness of screening and assessment or the extent to which screening and assessment identify a minimum proportion of patients at risk. This term compares the actual proportion of patients found at risk with an expected proportion. The expected proportion would be a population prevalence statistic that is diminished by a predetermined amount to allow for less-than-ideal performance.

The fourth term, I_{deliv}/R_{actual}, denotes the proportion of patients who received interventions of those who had been found eligible (ie, those whose assessments indicated risk). As for the first and second terms, the maximum value of this term is 1.

The fifth term, $\Delta B_{act}/\Delta B_{exp}$, reflects the extent to which intervention (including recommendation, pharmacotherapy, referral, and follow-up) results in a desirable change in a behavioral outcome variable over a particular time frame. As for the third term, this fifth term compares actual with expected performance. Expected reductions in behavioral outcome variables would be guided by prior research and diminished to allow for less-than-ideal performance.

Computed values for the third and fifth terms could exceed 1 if positive screen rates and intervention effectiveness are greater than expected. The authors propose

capping the values of these terms at 1, so that each term contributes equally to the overall metric.

The 5 terms are multiplied to produce a single composite quality index because the cumulative deviation from an expected magnitude of population risk reduction is a multiplicative function of the deviations from expected magnitude for each component of the BSI process. Therefore, the calculated value of the single quality measure Q for each behavioral topic would fall between 0 and 1, inclusive, with 0 indicating no population health impact and 1 indicating desirable population health impact.

Implementation Issues

A possible critique of outcome-based quality measures for BSI is that they may set an overly high bar. To address this concern, the values in terms 3 and 5 that define expected performance could initially be set somewhat low and increased over time because clinical settings have the opportunity to improve.

Another concern about outcome-based BSI quality measures is that they may discourage providers from serving disadvantaged patient populations because such populations may pose greater challenges in meeting quality thresholds.[51] One way to address this concern would be to take into account subgroup differences in behavioral outcomes found in prior trials when setting expected performance thresholds for terms 3 and 5. Another would be to set expected performance values low for all patients, as already described, track behavior change outcomes across different patient subgroups across many clinical settings, and establish experience-based expectations for behavioral outcomes.

Another potential concern is the accuracy of patient self-report for behavioral outcome measures. Though such reports are not perfectly accurate, patients do provide fairly accurate information when they do not fear adverse impacts.[47] Thus, to maximize the accuracy of self-report for clinical and quality measurement purposes, patient confidentiality must be vigorously protected, and clinical data should not be used for purposes that might deter accurate reporting, such as determining insurance premiums or health care benefits.

The proposed composite measures might be criticized for their complexity. Offsetting advantages are that they incorporate data on the reach and effectiveness of key BSI processes required for effectiveness and cost savings and that they could be calculated automatically from data in discrete fields in electronic medical records.

Standard procedure would be to validate quality measures before recommending widespread implementation. To conduct validity testing, providers likely would need to hire additional staff to deliver BSI, and there may not be sufficient financial incentive to do so. Perhaps the appropriate government agencies could fund service delivery and measurement testing in community health centers and Veterans Administration settings, and perhaps purchasers, payers, or philanthropic organizations could support similar efforts in private sector health care settings.

Conclusion

Current quality measures are inadequate for ensuring the delivery of high-quality BSI and generating documented improvements in health outcomes and cost savings. The new kind of composite quality measure proposed in this article could help by spawning new metrics that reflect the population health impacts of BSI as delivered in clinical settings, set appropriately high standards for BSI delivery, and serve as the bases for incentives to meet those standards.

Declaration of Conflicting Interests

The authors declared the following potential conflicts of interest with respect to the research, authorship, and/or publication of this article: Dr Brown is owner and chief executive officer of Wellsys, LLC, which offers training, consulting, and software to help health care settings and workplaces deliver behavioral screening and intervention. Dr Smith reports no conflicts of interest.

Funding

The authors received no financial support for the research, authorship, and/or publication of this article.

References

1. Bernstein SL, Yu S, Post LA, Dziura J, Rigotti NA. Undertreatment of tobacco use relative to other chronic conditions. *Am J Public Health.* 2013;103:e59-e65.
2. McKnight-Eily, Liu Y, Brewer RD, et al. Vital signs: communication between health professionals and their patients about alcohol use: 44 states and the District of Columbia, 2011. *MMWR Morb Mortal Wkly Rep.* 2014;63:16-22.
3. Gonzalez HM, Vega WA, Williams DR, Tarraf W, West BT, Neighbors HW. Depression care in the United States; too little for too few. *Arch Gen Psychiatry.* 2010;67:37-46.
4. Kushner RF. Tackling obesity; is primary care up to the challenge? *Arch Intern Med.* 2010;170:121-123.
5. Mokdad AH, Marks JS, Stroup DF, Gerberding JL. Actual causes of death in the United States, 2000. *JAMA.* 2004;291:1238-1245.
6. Centers for Disease Control and Prevention. The power of prevention: Chronic disease . . . the public health challenge of the 21st century. 2009. http://www.cdc.gov/chronicdisease/pdf/2009-power-of-prevention.pdf. Accessed December 3, 2014.
7. US Department of Health and Human Services. *The Health Consequences of Smoking—50 Years of Progress: A Report*

of the Surgeon General. Atlanta, GA: Centers for Disease Control and Prevention; 2014.
8. Bouchery EE, Harwood HJ, Sacks JJ, Simon CJ, Brewer RD. Economic costs of excessive alcohol consumption in the US, 2006. *Am J Prev Med.* 2011;41:516-524.
9. Greenberg PE, Kessler RC, Birnbaum HG, et al. The economic burden of depression in the United States; how did it change between 1990 and 2000? *J Clin Psychiatry.* 2003;64:1465-1475.
10. Finkelstein EA, Trogdon JG, Cohen JW, Dietz W. Annual medical spending attributable to obesity: payer- and service-specific estimates. *Health Aff (Millwood).* 2009; 28:w822-w831.
11. Finkelstein EA, DiBonaventura MD, Burgess SM, Hale BC. The costs of obesity in the workplace. *J Occup Environ Med.* 2010;52:971-976.
12. Centers for Disease Control and Prevention. Behavioral risk factor surveillance system, prevalence and trends data, nationwide (states and DC)—2012: tobacco use. http://apps.nccd.cdc.gov/brfss/display.asp?cat=TU&yr=2012&qkey=8161&state=UB. Accessed December 3, 2014.
13. Substance Abuse and Mental Health Services Administration. Results from the 2012 National Survey on Drug Use and Health: detailed tables. Table 2.26B. http://archive.samhsa.gov/data/NSDUH/2012SummNatFindDetTables/DetTabs/NSDUH-DetTabsSect2peTabs1to42-2012.htm. Accessed December 3, 2014.
14. Fiore MC, Jaén CR, Baker TB, et al. *Treating Tobacco Use and Dependence: 2008 Update. Clinical Practice Guideline*. Rockville, MD: Agency for Healthcare Research and Quality; 2008.
15. Partnership for Prevention. Rankings of preventive services for the US population. http://www.prevent.org/National-Commission-on-Prevention-Priorities/Rankings-of-Preventive-Services-for-the-US-Population.aspx.Accessed December 3, 2014.
16. Centers for Disease Control and Prevention. Behavioral risk factor surveillance system, prevalence and trends data, nationwide (states and DC)—2012: alcohol consumption. http://apps.nccd.cdc.gov/brfss/display.asp?cat=AC&yr=2012&qkey=8371&state=UB. Accessed December 3, 2014.
17. Substance Abuse and Mental Health Services Administration. Results from the 2012 National Survey on Drug Use and Health: detailed tables. Table 2.46B. http://archive.samhsa.gov/data/NSDUH/2012SummNatFindDetTables/DetTabs/NSDUH-DetTabsSect2peTabs43to84-2012.htm. Accessed December 3, 2014.
18. Centers for Disease Control and Prevention. Alcohol deaths. http://www.cdc.gov/features/alcohol-deaths. Accessed December 3, 2014.
19. National Business Group on Health. Alcohol misuse (screening and counseling). http://www.businessgrouphealth.org/preventive/topics/alcohol_misuse.cfm. Accessed December 3, 2014.
20. Fleming MF, Mundt MP, French MT, Manwell LB, Stauffacher EA, Barry KL. Benefit-cost analysis of brief physician advice with problem drinkers in primary care settings. *Med Care.* 2000;38:7-18.
21. Estee S, Wickizer T, He L, Shah MF, Mancuso D. Evaluation of the Washington State screening, brief intervention and referral to treatment project: cost outcomes for Medicaid patients screened in hospital emergency departments. *Med Care.* 2010;48:18-24.
22. Substance Abuse and Mental Health Services Administration. Results from the 2012 National Survey on Drug Use and Health: mental health findings. http://archive.samhsa.gov/data/NSDUH/2k12MH_FindingsandDetTables/2K12MHF/NSDUHmhfr2012.htm. Accessed December 3, 2014.
23. Ferrari AJ, Charlson FJ, Norman RE, et al. Burden of depressive disorders by country, sex, age, and year: findings from the global burden of disease study 2010. *PLoS Med.* 2013;10:e1001547.
24. McLaughlin KA. The public health impact of depression: a call for interdisciplinary prevention efforts. *Prev Sci.* 2011;12:361-371.
25. Thota AB, Sipe TA, Byard GJ, et al. Collaborative care to improve the management of depressive disorders; a community guide systematic review and meta-analysis. *Am J Prev Med.* 2012;42:525-538.
26. Cuijpers P, Smit F, van Straten A. Preventing the onset of depressive disorders: a meta-analytic review of psychological interventions. *Am J Psychiatry.* 2008;165: 1272-1280.
27. Unutzer J, Keaton WJ, Ming-Yu F, et al. Long-term cost effects of collaborative care for late-life depression. *Am J Manag Care.* 2008;14:95-100.
28. Centers for Disease Control and Prevention. Overweight and obesity; adult obesity facts. http://www.cdc.gov/obesity/data/adult.html. Accessed December 3, 2014.
29. US Preventive Services Task Force. Published recommendations. http://www.uspreventiveservicestaskforce.org/uspstopics.htm. Accessed December 3, 2014.
30. National Institute on Alcohol Abuse and Alcoholism (NIAAA). *Rethinking Drinking; Alcohol and Your Health.* Bethesda, MD: NIAAA; 2010. NIH Publication No. 13-3770.
31. Nash DB, Reifsnyder J, Fabius R, Pracilio VP. *Population Health: Creating a Culture of Wellness*. Sudbury, MA: Jones & Bartlett Learning; 2011.
32. Whooley MA, Avins AL, Miranda J, Browner WS. Case-finding instruments for depression: two questions are as good as many. *J Gen Intern Med.* 1997;12:439-445.
33. Babor TF, Higgins-Biddle JC, Saunders JB, Monteiro MG. *AUDIT: The Alcohol Use Disorders Identification Test. Guidelines for Use in Primary Care*. 2nd ed. Geneva, Switzerland: World Health Organization; 2001.
34. Kroenke K, Spitzer RL, Williams JB, Löwe B. The Patient Health Questionnaire somatic, anxiety and depressive symptoms scales: a systematic review. *Gen Hosp Psychiatry*. 2010;32:345-359.
35. Lai DT, Cahill K, Qin Y, Tang JL. Motivational interviewing for smoking cessation. *Cochrane Database Syst Rev*. 2010;(1):CD006936.
36. 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.

37. Schnoll RA, Rukstalis M, Wileyto EP, Shields AE. Smoking cessation treatment by primary care physicians; an update and call for training. *Am J Prev Med.* 2006;31:233-239.
38. Polydorou S, Gunderson EW, Levin FR. Training physicians to treat substance use disorders. *Curr Psychiatry Rep.* 2008;10:399-404.
39. Brown RL. Configuring health care for systematic behavioral screening and intervention. *Popul Health Manag.* 2011;14:299-305.
40. Yarnall KSH, Pollak KI, Østbye T, Krause KM, Michener JL. Primary care: is there enough time for prevention? *Am J Public Health.* 2003;93:635-641.
41. Altschuler J, Margolius D, Bodenheimer T, Grumbach K. Estimating a reasonable patient panel size for primary care physicians with team-based task delegation. *Ann Fam Med.* 2012;10:396-400.
42. Bodenheimer TS, Smith MD. Primary care: proposed solutions to the physician shortage without training more physicians. *Health Aff (Millwood).* 2013;32:1881-1886.
43. Brown RL, Moberg DP, Allen J, et al. A team approach to systematic behavioral screening and intervention. *Am J Manag Care.* 2014;20:e113-e121.
44. National Quality Forum. Quality positioning system. http://www.qualityforum.org/QPS. Accessed December 3, 2014.
45. Agency for Healthcare Research and Quality. National quality measures clearinghouse. http://www.qualitymeasures.ahrq.gov. Accessed December 3, 2014.
46. Esser MB, Hedden SL, Kanny D, Brewer RD, Gfroerer JC, Naimi TS. Prevalence of alcohol dependence among US adult drinkers, 2009-2011. *Prev Chronic Dis.* 2014;11:E206.
47. Del Boca FK, Darkes J. The validity of self-reports of alcohol consumption: state of the science and challenges for research. *Addiction.* 2003;98(suppl 2):1-12.
48. Global Adult Tobacco Survey Collaborative Group. Tobacco questions for surveys: a subset of key questions from the Global Adult Tobacco Survey (GATS): 2nd edition. http://www.who.int/tobacco/surveillance/en_tfi_tqs.pdf. Accessed May 11, 2014.
49. Centers for Disease Control and Prevention. 2013 Behavioral Risk Factor Surveillance System Questionnaire. http://www.cdc.gov/brfss/questionnaires/pdf-ques/2013BRFSS_English.pdf. Accessed December 3, 2014.
50. Lundahl BW, Kunz C, Brownell C, Burke BL. A meta-analysis of motivational interviewing: twenty-five years of empirical studies. *Res Soc Work Pract.* 2010;20:137-160.
51. Rubin HR, Pronovost P, Diette GB. The advantages and disadvantages of process-based measures of healthcare quality. *Int J Qual Health Care.* 2001;13:469-474.