Provider Screening for Depression in Patients Post-Myocardial Infarction

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Submitted to the
Faculty of Liberty University
In partial fulfillment of
The requirements for the degree
Of Doctor of Nursing Practice
By
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August, 2017

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PROVIDER SCREENING FOR DEPRESSION IN PATIENTS POST-MYOCARDIAL INFARCTION

A Scholarly Project

Presented to the

Faculty of Liberty University

In Partial Fulfillment of the Requirements for the Degree of

Doctor of Nursing Practice

By

Heather Vasioutovitch, BSN, RN

August, 2017
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Abstract

In this scholarly project, the project leader implemented a chart audit and provider feedback intervention with the aim of improving provider referrals for patients who screened positive for depression—a risk factor in the myocardial infarction (MI) population—with the Patient Health Questionnaire-9 (PHQ-9). The clinical question was developed in order to examine whether the depression-screening tool that was implemented improved provider referrals to the in-house licensed counselor or primary care physician after an educational feedback intervention, focusing on physicians, nurse practitioners (NPs) and physician assistants (PAs). The target population involved cardiology providers and adult patients who experienced a MI, including Non-ST Segment Elevation Myocardial Infarctions (NSTEMIs) and ST Segment Elevation Myocardial Infarctions (STEMIs). The project was an evidence-based practice (EBP) project using a quasi-experimental design for purposes of auditing charts and offering educational performance feedback to the providers, with the aim of increasing referrals for patients, post-MI who screened positive for depression. A retrospective chart audit was conducted for the analyses to assess the number of referrals made for patients who screened positive for depression during scheduled follow-up visits. The providers were given an aggregate performance report that specified the findings of the group. The Two-Proportions Test and the Fisher’s Exact Test were applied, and demonstrated no statistical improvement between the pre- and post-intervention data. This project revealed significant clinical value to the practice setting. Provider knowledge, perceptions, and attitudes must be assessed as well as the need to target the nursing population.

Keywords: depression, myocardial infarction (MI), referrals, chart audit, educational feedback, Patient Health Questionnaire-9 (PHQ-9)
Screening for Depression

The focus of this project was the need to address psychological factors, specifically depression, in patients who have suffered a myocardial infarction (MI). One trigger that brought this topic to the forefront is that failure to address psychological issues after a MI can lead to a less successful recovery (American Psychological Association [APA], 2011). Individuals post-MI are three times more likely to develop depressive symptoms compared to the overall population; major depressive disorder occurs in nearly a quarter of these patients, with an even greater percentage of patients experiencing increased levels of depression-like symptoms (Lichtman et al., 2009; Williams, 2011). Screening for depression is vital and should be utilized to identify patients, post-MI who may be at risk, as depression increases mortality and morbidity (Lichtman et al., 2009); however, there is a gap in provider awareness and implementation in depression screening (Blumenfield, Suojanen, & Weiss, 2012; Elderon, Smolderen, Na, & Whooley, 2011; Lichtman et al., 2014; McGuire, Eastwood, Hays, Macabasco-O’Connell, & Doering, 2014; Young, Nguyen, Roth, Broadberry, & Mackay, 2014). The aim of conducting this project was to increase provider knowledge of post-MI depression and to assess whether educational feedback increased the number of referrals made to the in-house licensed counselor or primary care physician. Depression must be addressed in patients who have had MIs, assessed as a risk factor, and treated accordingly to improve quality of life (American College of Cardiology [ACC], 2016; Blumenfield et al., 2012; Davidson et al., 2010; Denollet, Martens, Smith, & Burg, 2010; Dowlati, Herrmann, Swardfager, Reim, & Lanctôt, 2010; Elderon et al., 2011; Lichtman et al., 2008; Lichtman et al., 2009; McGuire et al., 2014; Meijer et al., 2011; von Känel & Begré, 2006; Young et al., 2014).
Background

There is a strong body of science that supports the need for psychological factors to be addressed in the post-MI population. Research has shown that identifying depression as a risk factor in patients post-MI can help prevent the occurrence of subsequent cardiovascular events (e.g., myocardial infarction, stroke, transient ischemic attack, heart failure, or death; Elderon et al., 2011). The Joint Commission and the Centers for Medicare & Medicaid Services collaboratively developed a specific set of core measures for hospitals and outpatient settings to improve quality, minimize collection of data for the measurements, and concentrate on the gathered data to improve the process of healthcare delivery (The Joint Commission, 2014). Acute myocardial infarction is one area of focus that The Joint Commission established in its set of core measures. Recently, the cardiovascular outpatient setting for which this project was implemented established a process for screening patients, post-MI for psychological factors by using the PHQ-9 and the Generalized Anxiety Disorder Questionnaire. Depression has been associated with an increased recurrence of myocardial infarctions, stroke, transient ischemic attacks, heart failure, and mortality, therefore, it is important to screen patients, post-MI to ensure they receive proper treatment (Davidson et al., 2010; de Jonge, van den Brink, Spijkerman, & Ormel, 2006; Elderon et al., 2011; Lichtman et al., 2008; Lichtman et al., 2009; von Känel & Begré, 2006; Witters & Wood, 2015).

The project leader’s goal in working with the outpatient setting in this study was for providers to understand the severity of depression in this at-risk population based on the required and newly implemented depression-screening tool, in addition to making referrals appropriately as outlined in the American Heart Association (AHA) guidelines. The AHA standards for depression screening in the post-MI population recommend a two-step screening method
involving the use of the PHQ-2 questionnaire followed by the PHQ-9 screening instrument, if warranted (Lichtman et al., 2008). The PHQ-2 should be completed first, and if the response is “yes” to one or both questions, then the individual needs to be referred for a more comprehensive assessment, or should complete the PHQ-9 (Lichtman et al., 2008).

**Purpose**

The purpose of this project was to implement a chart audit and feedback intervention aimed at improving the amount of referrals completed by providers for patients with a recent MI who screened positive based on the depression-screening tool. Charts were audited for the number of documented referrals in patients who screened positive for depression prior to the educational intervention. During the performance feedback intervention, the providers were educated on the established AHA guidelines, the link between depression and MIs, and the importance of referring these individuals to the in-house licensed counselor or primary care physician. After this educational intervention, the project leader conducted an additional review of charts to evaluate if there was an increase in the number of referrals made within this subset of patients.

The target population for this project were cardiology providers who conducted post-MI post-hospitalization office visits. Provider education feedback included the importance of referring patients who screened positive for depression in the adult MI population and included provider referral performance. The goal of the feedback intervention was to see an increase in referrals of patients post-MI who screened positive for depression on the PHQ-9 to the in-house licensed counselor or primary care physician by educating cardiology providers on the importance of screening for and treating depression in the post-MI population. Whether or not
this goal was met was measured by a chart audit to determine if there was an increase in the number of referrals made after the feedback intervention.

**Clinical Question**

Does a chart audit and provider feedback intervention improve the number of cardiology provider referrals to the in-house counselor or primary care physician for patients post-MI who have screened positive for depression?

**Population:** The target population was cardiology providers at an outpatient cardiology office in Central Virginia.

**Intervention:** The primary intervention of this project was auditing charts and offering educational performance feedback to the providers.

**Comparison:** Audited charts were compared prior to (control group) and after the educational performance feedback intervention (comparison group).

**Outcomes:** The primary outcome was increasing the number of referrals made by cardiology providers to the in-house licensed counselor or primary care physician for patients post-MI based on their depression-screening tool (PHQ-9) results.

**Literature Review and Synthesis**

A comprehensive electronic database search was completed using EBSCOhost, CINAHL, PubMed, MEDLINE, the Cochrane Library, SocINDEX, Health Source: Nursing/Academic Edition, Health and Psychosocial Instruments, and Psychology and Behavioral Sciences Collection. Search terms and phrases included *depression, acute myocardial infarction, chart audit, and feedback.* Studies that were reviewed included randomized controlled trials (RCTs), evidence-based clinical practice guidelines based on systematic reviews of RCTs, observation studies, surveys, questionnaires, prospective cohort studies, longitudinal studies,
meta-analysis reviews, placebo-controlled studies, and double-blind trials. The Levels of Evidence (LOE) included: I, III, IV, V, VI, and VII. Literature was narrowed to include the English language with full-text articles only, but no limitation was placed on publication dates.

**AHA Recommendations for Management of Depression**

The guideline entitled, *Depression and coronary heart disease recommendations for screening, referral, and treatment: A science advisory from the American Heart Association Prevention Committee of the Council on Cardiovascular Nursing, Council on Clinical Cardiology, Council on Epidemiology and Prevention, and Interdisciplinary Council on Quality of Care and Outcomes Research*, was developed by the American Heart Association (AHA). The objective of the AHA Science Advisory is to deliver rapid, transparent, and reliable standing on scientific concerns, although an AHA advisory board must not be viewed as a treatment guideline (Bigger & Glassman, 2010). All of the AHA statements go through a peer review process and are approved by the AHA Science Advisory and Coordinating Committee, which is AHA’s chief body of science (Bigger & Glassman, 2010). The American Heart Association requested the American Psychological Association (APA) to review the proposed statement because this specific advisory addressed the relationship between cardiac and psychological health; the APA validated the AHA advisory (Bigger & Glassman, 2010).

**AHA Recommendations for PHQ Screening**

The AHA issued a scientific statement recommending routine screening, referral, and treatment for patients with coronary heart disease and depression, applying a two-step implementation of the Patient Health Questionnaire (PHQ), followed by a nine-step PHQ if indicated (Lichtman et al., 2008). The Patient Health Questionnaire-2 (PHQ-2) inquires about the
occurrence of depressed mood and anhedonia by asking the following questions: “Over the past two weeks, how often have you been bothered by any of the following problems?

(1) Little interest or pleasure in doing things.

(2) Feeling down, depressed, or hopeless” (Lichtman et al., 2008, p. 1769).

The AHA recommends utilizing the PHQ-2, at a minimum, in order to distinguish the risk of depression in patients. If the response is “yes” to either one of the questions, then referral is warranted, in addition to screening all items of the Patient Health Questionnaire-9 (Bigger & Glassman, 2010; Lichtman et al., 2008).

The PHQ-9 is a short tool to screen for depression (Lichtman et al., 2008), and includes the following questions:

Over the past two weeks how often have you been bothered by any of the following problems?

(1) Little interest or pleasure in doing things.

(2) Feeling down, depressed, or hopeless.

(3) Trouble falling asleep, staying asleep, or sleeping too much.

(4) Feeling tired or having little energy.

(5) Poor appetite or overeating.

(6) Feeling bad about yourself, feeling that you are a failure, or feeling that you have let yourself or your family down.

(7) Trouble concentrating on things such as reading the newspaper or watching television.

(8) Moving or speaking so slowly that other people could have noticed. Or being so fidgety or restless that you have been moving around a lot more than usual.
(9) Thinking that you would be better off dead or that you want to hurt yourself in some way. (Lichtman et al., 2008, p. 1769; Appendix H)

The PHQ-2 and PHQ-9 offer healthcare providers brief, self-administered instruments for evaluating depression (APA, 2016b). A result is generated based on the answers and added to obtain a total score for depression severity (APA, 2016b). These questionnaires are commonly used for screening and diagnosing depression as well as choosing and examining therapeutic interventions (APA, 2016b). Reliability and validity of the screening tool have specified all-encompassing dependable psychosocial properties (APA, 2016b). PHQ-9 scores (>10) have demonstrated a sensitivity of 88% and specificity of 88% for depression (APA, 2016b). Internal consistency has also been proven to be high and a study involving two different patient groups produced Cronbach’s alphas of 0.86 and 0.89 (APA, 2016b).

The majority of individuals are able to finish the questionnaire in five minutes or less, and the results include a temporary depression diagnosis and an intensity score that can be applied in the selection of treatment options and further observation (Lichtman et al., 2008). According to the AHA (2008), follow-up during a subsequent visit is advised for patients with mild symptoms, but in patients with moderate to severe results, a healthcare provider must review the answers with the patient. Overall, patients who score a high probability of depression through the use of the questionnaire must be referred to a qualified professional for a more comprehensive clinical evaluation to determine an appropriate personalized treatment intervention (Lichtman et al., 2008). Patients who require a more inclusive clinical assessment must be evaluated for the occurrence of other psychosocial conditions in order to avoid further adverse outcomes (Lichtman et al., 2008).
According to the AHA (2008), existing evidence signifies that only half of all cardiology providers treat depression in their patients, and those patients who are identified as depressed are not being treated. Some cardiology providers are hesitant to treat depression in patients after an acute coronary episode because they consider depression a “normal” response in stressful life events (Lichtman et al., 2008). In numerous instances, depression may occur prior to, or long after an acute cardiac episode; therefore, it is imperative to evaluate depression in cardiac patients with the objective of targeting those in need of therapeutic intervention and support service industries (Lichtman et al., 2008).

Cardiologists should take depression into account in the management of CHD [coronary heart disease], regardless of whether they treat the depression or refer the patient to a healthcare provider who is qualified in the assessment and treatment of depression, which often may be the patient’s primary care provider. (Lichtman et al., 2008, p. 1770)

**Evidence Supporting the Link between MI and Depression**

The literature reviewed on the topic of depression and cardiac patients established that further assessment, referral, and treatment plans are needed in this specific population (ACC, 2016; de Jonge et al., 2006; Denollet et al., 2010; Elderon et al., 2011; Lichtman et al., 2014; McGuire et al., 2014; Meijer et al., 2011; Witters & Wood, 2015). Depression outcomes can be more severe in individuals with co-existing depression (ACC, 2016). Patients diagnosed with depression have increased risks of MI and death compared to individuals who are not depressed (ACC, 2016). Individuals with a current diagnosis of depression, who are also receiving treatment, are at an even higher risk for symptoms to exacerbate after a heart attack (ACC, 2016; Witters & Wood, 2015). Almost 40% of post-MI individuals have either major or minor depression (von Känel & Begré, 2006). Individuals who have developed depression for the first
time post-MI have been identified to be at the highest risk of suffering subsequent cardiac events (von Känel & Begré, 2006).

Depression was not being addressed in patients with coronary artery disease or being appropriately treated, according to some studies (ACC, 2016; Dowlati et al., 2010; McGuire et al., 2014; Meijer et al., 2011; von Känel & Begré, 2006; Witters & Wood, 2015). Healthcare providers must know the importance of assessing depression as a risk factor and referring patients to a psychologist, licensed counselor, or primary care physician for further evaluation and management. The majority of the studies indicated that depression is frequently not assessed and often left untreated (ACC, 2016; de Jonge et al., 2006; Dowlati et al., 2010; Elderon et al., 2011; Lichtman et al., 2009; McGuire et al., 2014; Meijer et al., 2011; von Känel & Begré, 2006). Evidence supports that providers need to identify depression as a risk factor in the post-MI population, and depression must be identified as a potential sign of further cardiac events (e.g., myocardial infarction, stroke, transient ischemic attack, heart failure, or death; Davidson et al., 2010; Elderon et al., 2011; Hosseini et al., 2011; Lichtman et al., 2009; Young et al., 2014).

Utilizing depression screening tools was recommended in 13 out of the 18 articles on the topic of depression and coronary heart disease (ACC, 2016; Bigger & Glassman, 2010; Blumenfield et al., 2012; Davidson et al., 2010; de Jonge et al., 2006; Denollet et al., 2010; Elderon et al., 2011; Lichtman et al., 2008; Lichtman et al., 2009; Lichtman et al., 2014; McGuire et al., 2014; Williams, 2011; Young et al., 2014). Screening patients for depression is imperative because depression is a risk factor for further myocardial infarctions, severe angina, stroke, transient ischemic attack, heart failure, or death (ACC, 2016; Elderon et al., 2011; Lichtman et al., 2008). Screening must be done at routine interims of time to prevent missed opportunities to intervene (ACC, 2016). Regularly screening patients with coronary heart disease
for depressive symptoms was recommended in the outpatient setting for this project to ensure that proper follow-up on psychological factors was taking place (Davidson et al., 2010; Lichtman et al., 2009; Meijer et al., 2011; Young et al., 2014).

**Evidence Suggesting Identifying and Treating Depression post-MI Improves Outcomes**

Once depression symptoms have been identified and treated in patients with coronary heart disease, the rate of mortality and reoccurrence of cardiac events declines (Denollet et al., 2010; Dowlati et al., 2010; Lichtman et al., 2014; Meijer et al., 2011). Furthermore, the literature signified that if signs of depression were left untreated or unidentified, the risk of cardiac events increased, as did the rate of mortality (Blumenfield et al., 2012; Davidson et al., 2010; Denollet et al., 2010; Meijer et al., 2011). Psychological factors have been linked to a less favorable outcome and a poorer prognosis in patients with myocardial infarctions. According to de Jonge et al., it is important to implement a more individually devised treatment plan for each patient (as cited in von Känel & Begré, 2006). Due to the multitude of factors contributing to post-MI depression, it is presumed to be both biological and psychosocial in nature (von Känel & Begré, 2006). Based on the evidence and review of literature, the project leader’s main objectives in regard to the cardiology providers treating individuals, post-MI, were to increase awareness and screening for depression, to review the PHQ-9 results completed by the patients, and to increase the number of referrals made.

**Chart Audit and Provider Feedback to Improve Outcomes**

Evidence within the literature demonstrates the significance chart audit and provider feedback systems have within organizations. An audit and feedback intervention is one of the most widely implemented strategies for reducing gaps within healthcare, improving professional practice, and refining quality improvement interventions (Colquhoun et al., 2013; Ivers et al.,
The project leader believed that an audit and feedback intervention would alert healthcare professionals to change their current practice routine when provided with educational feedback displaying inconsistency of their current practice with an appropriate objective (Ivers et al., 2012). The phrase “Audit and Feedback” (A&F) has been commonly used to indicate a various collection of interventions that provide feedback to healthcare providers on current practice (Colquhoun et al., 2013). A&F can be described as a synthesis of clinical performance (audit) over a specified timeframe, and the delivery of that synthesis (feedback) to specific healthcare providers, practitioners, teams, or organizations (Colquhoun et al., 2013). Numerous studies have been conducted using the A&F method and include randomized-controlled trials (RCT), non-RCT designs, systematic evaluations, and meta-analysis reviews (Brehaut et al., 2016; Colquhoun et al., 2013; Ivers et al., 2012; O’Rourke, Fraser, Boström, Baylon, & Sales, 2013).

The review of literature was extensive and identified the AHA guidelines for depression management through the utilization of the PHQ screening developed by Drs. Kroenke, Spitzer, Williams (2001) and colleagues in the mid-1990’s (Lichtman et al., 2008). As described above, there was clear evidence supporting the correlation between MI and depression (ACC, 2016; de Jonge et al., 2006; Denollet et al., 2010; Elderon et al., 2011; Lichtman et al., 2014; McGuire et al., 2014; Meijer et al., 2011; Witters & Wood, 2015). The evidence revealed that proper identification and treatment of post-MI depression improves outcomes in patient health (Blumenfield et al., 2012; Davidson et al., 2010; Denollet et al., 2010; Dowlati et al., 2010; Lichtman et al., 2014; Meijer et al., 2011; von Känel & Begré, 2006). The review of literature indicates quality advances in healthcare and provider practice when chart audits and provider feedback interventions are implemented (Brehaut et al., 2016; Colquhoun et al., 2013; Ivers et al., 2012; O’Rourke et al., 2013).
Conceptual Framework

The Iowa Model of Evidence-Based Practice to Promote Excellence in Health Care was used as the conceptual framework for the anticipated practice change in this study. It is composed of combined evidence-based practice (EBP) directed toward clinical practice settings in order to advance quality care and outcomes. A conceptual framework can be compared to a map because it demonstrates the joining of key elements with that of the scholarly project (Moran, 2014). The steps involved in the model include choosing a topic by identifying triggers, creating a team, obtaining evidence, ranking the evidence, designing and piloting the practice change, implementing the project, integrating and sustaining the practice change, and disseminating the findings (see Appendix G for permission from University of Iowa Hospitals to use this model). The Iowa Model was the most applicable model to lead this scholarly project because its main objective is to serve as a guide for healthcare providers, and it utilizes evidence-based findings for improvement of care (Titler et al., 2001).

After obtaining the required approvals from the Project Chair, committee members, primary institute’s Institutional Review Board (IRB), project organization’s IRB, and the Medical Director where the project was implemented, the project leader piloted the audit and educational feedback interventions in accordance with the Iowa Model of EBP. During the implementation phase of the project, a pre-intervention chart audit of the electronic medical record (EMR) was conducted retrospectively within the specified timeframe, followed by analysis of the collected data. The next step during the implementation process was administering the educational feedback session to the cardiology providers. A post-intervention EMR chart audit was subsequently conducted after the 30-day timeframe in order to re-assess performance data and analyze the results. During the evaluation process of the project the project
leader determined whether the evidence-based chart audit, provider performance feedback, and educational intervention led to an increased number of referrals made by providers for patients who screened positive for depression post-MI. In order to offer incentive, provider performance feedback was administered after the second chart audit was concluded to further increase screening and referrals made for patients, as recommended by the AHA guidelines.

In alignment with the Iowa Model, the project leader identified a knowledge-focused trigger to evaluate clinical efficacy. It was also determined that the selected topic was viewed as a priority for the outpatient office due to their recent implementation of a new protocol for depression screening in the post-MI population, which included the PHQ-9 screening instrument and the Generalized Anxiety Disorder Item-7 Assessment. The third step involved the formation of a team responsible for the advancement, implementation, and assessment of the EBP project (Titler et al., 2001). The project leader gathered, synthesized, and evaluated relevant literature studies in accordance with the Iowa Model of EBP. The final step that was completed included monitoring and examining the structure, development, and measurable outcomes of the EBP. The project leader verbally presented the scholarly project proposal to the Project Chair and committee members, who provided feedback and requested modifications as needed for the purpose of improving the project. Once the chair and committee approved the proposal, pre- and post-intervention chart audits for increased referrals within the target population were conducted and compared with the verbal and written educational feedback presented to the cardiology providers.

The Iowa Model recommends extensive literature reviews, which allows researchers to find problem-focused triggers that question the existing practice and inquire whether patient care could be enhanced by utilizing the findings and outcomes reached (Clanton, 2014). There are
multiple evidence-based studies and systematic reviews indicating the risk that depression poses to individuals post-MI and the need for referrals (ACC, 2016; APA, 2016a; Bigger & Glassman, 2010; Davidson et al., 2010; de Jonge et al., 2006; Dowlati et al., 2010; Elderon et al., 2011; Hosseini et al., 2011; Lichtman et al., 2008; Lichtman et al., 2009; Lichtman et al., 2014; McGuire et al., 2014; Meijer et al., 2011; von Känel & Begré, 2006; Witters & Wood, 2015; Williams, 2011; Young et al., 2014). Uniformity was found throughout critiquing the literature of common results as well as diversity among the various studies conducted. The utilization of the Iowa Model successfully supported this evidence-based scholarly project. After the project was implemented, it was assessed that no improvement in practice change occurred; therefore it is necessary to continue to evaluate quality of care and new knowledge. The results of this project showed that there was no improvement in practice change for the providers who attended the educational intervention, which indicates that it is necessary to continue to evaluate quality of care and implement new knowledge that can enhance best practices.

**Design, Methodology, and Statistical Analysis**

The design for this evidence-based practice project was a quasi-experimental approach to collect and analyze data, using a one-group pretest/posttest strategy. This type of design allowed the project leader and personnel to evaluate the effects of chart auditing and assess the educational feedback intervention presented to the cardiology providers. The outpatient cardiology office recently implemented a depression-screening instrument (the PHQ-9 and Generalized Anxiety Disorder Item-7 Assessment) for providers to screen every patient during follow-up visits, post-hospitalization. Consistent with established guidelines, studies have revealed that follow-up visits decrease mortality during hospitalization and at the six-month post-discharge period (Cubbon et al., 2007; Mercado, Smith, & McConnon, 2013; Peterson et al.,
2006). Therapeutic treatment plans, including medications, have been shown to decrease mortality at six months, which is why this timeframe would have been utilized during the pre-intervention chart auditing if the recently executed screening tools had not been implemented within the outpatient setting (Mercado et al., 2013). Ideally, the period to include the post-MI population (pre-intervention) in this study would have been within a six-month span due to evidence-based standards that were established in previous studies (Cubbon et al., 2007; Mercado et al., 2013; Peterson et al., 2006). As a result of the unforeseen implementation of the depression screening tools, the timeframe for the pre-intervention chart audit for this project had to commence on January 3, 2017 (the first day the screening instruments were initiated).

The dependent variable in this project was whether there was documentation that providers were referring patients who screened positive for depression based on the results from the PHQ-9, by allocating a specific number (0 = N/A; 1 = unmet; 2 = met). Zero signified that the patient was screened but did not meet the requirements for referral based on the AHA guidelines. Number 1 indicated that the patient was not appropriately referred when warranted, or if the PHQ-9 was not even administered to the patient; therefore, not having the ability to identify whether the he or she needed to be referred since no opportunity was given to complete the screening tool.

In order to compare the pre- and post-intervention dependent variables, a nonparametric inferential statistical analysis was utilized. Nonparametric methods do not make inferences about the sample of the population division, which was one of the reasons this type of method was selected. Another reason a nonparametric inferential statistical analysis was appropriate for this project is due to the smaller sample size gathered and the data that were divided into specific categories, as previously described. The Fisher’s Exact Test was used to compare the pre- and
post-intervention in order to assess the cardiology provider’s utilization of the aggregate performance report. The Two-Proportions Test was applied when comparing the pre- and post-intervention usage of the PHQ-9 screening tool among the providers. Both tests were implemented to assess and measure success of the practice change.

**Measurable Objectives**

Measurable objectives included an increase in the number of documented referrals made by providers to the in-house licensed counselor or primary care physician, for patients post-MI who screened positive for depression. This was assessed after the educational feedback intervention was completed. The providers were offered additional feedback after the second chart audit was conducted. Measurable objectives were collected and analyzed during the pre- and post-intervention periods. The goal was for providers to be more aware of the serious risks depression can pose in the post-MI population and to increase the number of referrals made in patients who have screened positive for depression.

**Sample and Setting**

The setting for this project was an outpatient cardiology office in Central Virginia. It is a national benchmark organization for cardiovascular care and committed to the prevention, diagnosis, and management of heart and vascular disorders. The office is comprised of cardiologists, advanced practice providers (nurse practitioners and physician assistants), cardiothoracic surgeons, pharmacists, and a full-time staff of nurses, medical assistants, and certified technicians. The outpatient clinic is open Monday-Friday, 8:00 a.m. to 5:00 p.m. with a healthcare provider on-call twenty-four hours a day, seven days a week. The proposed project was presented to the Medical Director of the outpatient office and the project leader obtained a letter of support to conduct the study (Appendix D).
The sample population consisted of two groups: (a) cardiology providers (Physicians/NPs/PAs) and (b) adult patients post-MI, comprising Non-ST Segment Elevation Myocardial Infarctions (NSTEMIs) and ST Segment Elevation Myocardial Infarctions (STEMIs). The outpatient cardiology office consisted of physicians, nurse practitioners, and physician assistants, equaling a total of 50 providers \((N = 50)\). Approximately 15 patients are seen each day for cardiology visits (scheduled follow-ups, post-hospital care appointments, episodic add-ons, and first-time office visits).

The inclusion criteria for the primary sample population (aggregate performance of cardiology providers) consisted of physicians, nurse practitioners, and physician assistants within the outpatient cardiology clinic. The exclusion criteria included (a) non-cardiac providers (i.e., RNs, licensed practical nurses, laboratory assistants, and diagnostic technicians), (b) pediatric cardiologists, (c) cardiothoracic surgeons, (d) subspecialty clinical providers (congestive heart failure clinic and arrhythmia clinic), and (e) the Project Chair and practicum site preceptor.

The inclusion criteria for the secondary sample population (adult patients post-MI: STEMIs and NSTEMIs) involved (a) individuals post-MI, post-hospitalization, (b) follow-up office visits with a cardiology provider within the specified timeframe (from January 3, 2017 to March 23, 2017), (c) diagnosis of MI (ICD-10 Code I21.01, I21.02, I21.09, I21.11, I21.19, I21.21, I21.29, I21.3, I21.4, I22.0, I22.1, I22.2, I22.8, and I22.9), and (d) age \(\geq 18\) years old. The exclusion criteria for the secondary sample population included (a) individuals who did not have an MI, (b) individuals post-MI prior to January 3, 2017, and (c) age \(< 18\) years old.

The outpatient cardiology center developed a post-MI transition clinic, called the H2O (Hospital to Office) clinic. The H2O clinic was created in April 2016, specifically for patients post-MI after hospitalization. Individuals being discharged from the hospital are scheduled
within seven to ten days for follow-up with a cardiology provider, primary care physician (PCP), or have an appointment with the H2O clinic. The purposes of the clinic are to follow-up promptly with a Registered Nurse (RN), to reconcile medications to the office’s EMR, to confirm follow-up appointments, to triage potential issues, and to decrease hospital readmission rates. During this one-time visit, the RN assesses vital signs, verifies the prescribed medications, educates the patient on the topic of diet, exercise, smoking cessation, cardiac rehabilitation, and addresses any complications or concerns. The project leader considered the H2O clinic as a means to inform the providers of the opportunities the H2O clinic offers in screening for depression and increasing the number of referrals made.

**Ethical Considerations**

The project leader and committee have completed the Collaborative Institutional Training Initiative (CITI; Appendix I). The final committee-approved project protocol was submitted to the primary institute Institutional Review Board (IRB; Appendix E). Based on the final approval from primary institute IRB, the protocol was submitted to the IRB within the cardiology outpatient’s health care system (Appendix F). The project leader was in charge of selecting which charts to include and exclude by confirming the identification of MI documentation (ICD-10 Code I21.01, I21.02, I21.09, I21.11, I21.19, I21.21, I21.29, I21.3, I21.4, I22.0, I22.1, I22.2, I22.8, and I22.9) within the specified timeframe, while maintaining the parameters for inclusion/exclusion criteria as specified above. The project leader created three databases from Excel and converted them to a password-secured PDF file in order to remain compliant with the standards set forth by the Health Insurance Portability and Accountability Act (HIPAA). The three databases included a Referral for Screening Depression in the MI Population Chart Audit
Template (Appendix B), an Aggregate Educational Feedback Report Template (Appendix C), and a Provider and Chart Identification Template (Appendix A).

The project leader will preserve the three main databases in a password-secured computer for three years after the conclusion of the project. No duplicates will be made of these records. After three years, the material will be erased from the computer in compliance with the standards enacted. The project leader audited specific charts for the number of referrals made for patients who screened positive for depression based on the PHQ-9 results (Appendix B). The data were gathered, documented, and analyzed using the Statistical Package for the Social Sciences (SPSS) database. Data documentation on the Referral for Screening Depression in the MI Population Chart Audit Template, the Aggregate Educational Feedback Report Template, and the Provider and Chart Identification Template were de-identified of patient and provider information. There were no patient or provider identifying material connected with any presentations, posters, or publications of the project. The providers can be assured of confidentiality, but not anonymity.

**Intervention, Tool, and Data Collection**

A baseline (pre-intervention) internal chart audit of the EMR system, known as Centricity, was conducted to evaluate the number of referrals made by providers for individuals who screened positive for depression in the MI population. During chart reviews, the following items were assessed: utilization of the PHQ-9 screening instrument, outcome of the PHQ-9 screening tool, and referral(s) made to the in-house licensed counselor or primary care physician based on the outcome of the PHQ-9 (Appendices A, B, & C). A pre-intervention chart audit was conducted starting January 3, 2017 through March 23, 2017. As previously described, a six-month timeframe would have been ideal for the retrospective period, but due to the unanticipated implementation of the depression screening tool, the period to conduct the pre-intervention chart
audit needed to begin January 3, 2017 (the first day the screening tool was initiated). A 30-day internal EMR chart audit was applied for the post-intervention analysis. An aggregate approach was utilized due to the fact that during follow-up visits some cardiology providers assess more individuals after an MI compared to other providers. The cardiology providers were given a verbal and printed report that specified their performance as a group. The project leader administered this aggregate performance report (pre-intervention) to the providers during a scheduled team meeting.

A nonrandom purposive sampling method was indicated for the primary sample population because this study specifically included cardiology providers that assess patients on post-MI follow-up visits, excluding providers who are a part of the Arrhythmia and CHF clinics. A systematic sampling technique, which is a type of probability sampling method, was selected for the chart review aspect because it allowed the audited charts to be chosen in an evenly distributed interval. The approach was strictly aggregate due to certain providers evaluating more patients who have experienced MIs compared to others. The sample size included charts collected from the cardiology providers to obtain an adequate amount of data. Provider feedback was administered after the second chart audit was conducted in order to offer incentive to further increase screening and referrals recommended by the established AHA guidelines.

The project leader delivered information on provider utilization of referrals based on the depression-screening tool during the educational feedback intervention, as well as on the post-intervention chart audit (Appendix B). Reliability and validity of the depression-screening tool (PHQ-9 and PHQ-2) have strong support for symptoms of depression (APA, 2016b). The AHA has published a scientific statement endorsing routine screening, referral, and treatment for
patients, post-MI, who show signs of depression after applying a two-step implementation of the PHQ (Lichtman et al., 2008).

**Feasibility Analysis**

The feasibility analysis included resources, personnel, technology, budget, and cost/benefit analysis. The planned location had a designed structure already set in place that was conducive to the project leader’s plan for collecting data. The project leader obtained approval and support of major participants and team members prior to beginning the project.

**Personnel**

The following is a list of the personnel who played a role in either conducting or participating in this project:

- Project leader
- Project Chair
- Committee members
- Nursing staff and office administrative support
- Key stakeholders (physicians/NPs/PAs)
- Information technology workers

**Resources and Equipment**

The following resources and equipment were necessary in order to complete the project:

- Computer
- Electronic Medical Record
- Excel
- SPSS
- Aggregate Educational Feedback Report Template
Referrals for Screening Depression in the MI Population EMR Audit Template

Provider and Chart Identification Template

**Cost/Benefit Analysis**

The cost/benefit analysis remained budget neutral. The cost/benefit comparison can be viewed as acceptable due to the fact that early recognition of depression greatly reduces the risk of further cardiac events, morbidity, and hospital readmission rates. Additionally, the American Heart Association Science Advisory, American College of Cardiology, and other expert professional organizations have linked early recognition of depressive-like symptoms within this population with more successful recoveries, and improved outcomes and quality of life. There is strong evidence supporting healthcare providers to assess, to refer, and to treat depression in patients post-MI (ACC, 2016; Lichtman et al., 2008). The potential benefit greatly outweighs the risks through improved screening for depression in the post-MI population with an obvious reduction in morbidity, mortality, and hospital readmission rates (ACC, 2016; de Jonge et al., 2006; Denollet et al., 2010; Elderon et al., 2011; Lichtman et al., 2014; McGuire et al., 2014; Meijer et al., 2011; Witters & Wood, 2015).

**Timeline of Project Stages**

**Preparation.** In accordance with the Iowa Model of EBP to Promote Excellence in Health Care, the following steps were achieved: (a) problem-focused trigger was identified, (b) team was created, (c) evidence was obtained and ranked, (d) practice change was piloted, (e) project was implemented, (f) practice change was integrated and sustained, and (g) findings were disseminated (see Appendix G for permission from University of Iowa Hospitals to use the Iowa Model). The steps that occurred during the preparation stage included all of the following:
• By September 26, 2016, a team was formed that included the Scholarly Project Committee Chair and two subsequent Scholarly Project Committee Members.

• On October 17, 2016, the project proposal was presented to the Medical Director of the cardiology outpatient clinic and approval was obtained.

• On October 19, 2016, the proposal was reported to the committee with feedback and questions answered following the Power Point presentation. All members of the committee signed the Approval of the Scholarly Project Form along with the final authorization made by the Project Chair.

• On October 23, 2016, the proposal was submitted to Liberty University’s (LU’s) Institutional Review Board (IRB).

• By November 30, 2016, approval was received from LU’s IRB.

• On December 1, 2016, the approved LU IRB documentation and proposal was submitted to the IRB located within the cardiology outpatient’s health care system.

• By January 9, 2017, outpatient health care system’s IRB approved the proposal through their Exempt Committee with signatures obtained on the Exempt Status Form.

**Implementation.** The audit and feedback intervention for practice change was designed and piloted in accordance with the Iowa Model of EBP. The steps that occurred during this timeframe included the following:

• On March 23, 2017, pre-intervention internal chart audit of the EMR was conducted retrospectively (January 3, 2017-March 23, 2017).

• By April 3, 2017, pre-intervention data analysis began.

• By April 5, 2017, pre-intervention data analysis was complete.
• On April 24, 2017, performance feedback intervention was provided to the cardiology physicians.

• On April 27, 2017, performance feedback intervention was provided to the cardiology advanced practice providers (NPs and PAs).

• By June 29, 2017, the post-intervention EMR internal chart audit was conducted retrospectively (30-day timeframe: May 1, 2017-June 1, 2017).

• By July 6, 2017, the post-intervention measurement was completed (re-assessed performance data and analyzed results).

**Evaluation.** In accordance with the Iowa Model of EBP, the audit and feedback intervention for practice change was evaluated and determined as to whether the chart audit, provider feedback, and educational intervention led to an increased number of referrals made by providers for patients who had screened positive for depression in the post-MI population. The steps that occurred during this phase included the following:

• By June 29, 2017, the post-intervention chart audit was conducted.

• By July 6, 2017, the post-intervention internal chart audit data were investigated and analyzed.

• By August 2, 2017, the project outcomes and objectives were completed.

• By August 4, 2017, the written scholarly project was disseminated to the Chair.

• By August 17, 2017, the Chair-approved written scholarly project was disseminated to the other committee members with feedback and answers concluded.

**Evaluation/Analysis**

The anticipated outcome of this project was for cardiology providers to demonstrate an increased number of referrals for patients who screened positive for depression in the post-MI
population after using the required depression-screening tool (PHQ-9). Including depression as a risk factor in patients who have experienced an MI would have a significant influence on patients’ recovery rates, quality of life, and wellbeing. With this intervention (chart audit and educational feedback), providers were afforded the opportunity to increase the number of referrals made based on the AHA recommended guidelines as a standard of care within the practice setting.

**Cardiology Provider Educational Feedback Intervention**

An educational feedback intervention was prepared for the cardiology physicians and advanced practice providers (APPs) after analyzing the pre-intervention data. A PowerPoint presentation was delivered to the cardiologists and APPs along with an evidence-based educational handout. The information offered at the provider meeting contained the following:

- purpose of the scholarly project,
- timeframe the project was conducted,
- inclusion and exclusion criteria for the primary and secondary sample population,
- established standards and guidelines set forth by the American Heart Association,
- evidence supporting the link between MI, depression, and future cardiovascular events,
- statistics calculated in the outpatient practice from the pre-intervention chart audit, and
- objectives for the providers to pursue and to achieve (i.e. increase awareness and screening for depression, review the PHQ-9 results, and increase the number of referrals when indicated).
Results

According to the AHA guideline and algorithm *Screening for Depression in Patients with Coronary Heart Disease*, if patients score 10 points or greater out of 27 points on the PHQ-9 screening tool, they should be referred for additional clinical assessment by a qualified professional to evaluate and establish an appropriate individualized treatment plan (Lichtman et al., 2008). A total of 49 charts \((n = 49)\) were collected during the pre-intervention (baseline) chart audit, based on the inclusion and exclusion criteria previously discussed. Evaluation of this set of data points revealed that screening had been documented in 32 of the audited charts, representing that 65% had been screened appropriately through the use of the PHQ-9. This chart audit revealed that depression screening had not been documented on 17 patients, demonstrating that 35% had no documentation that the PHQ-9 was being used to screen patients for depression. Of those 32 charts, 27 showed no indication that a referral was needed, signifying that 84% had been screened but did not meet the criteria for referral (less than 10 points on the PHQ-9). Out of those 32 charts that documented PHQ-9 screening, five qualified for referrals, indicating that 16% met referral criteria based on the AHA guidelines. Documentation revealed that three of those five charts did receive a referral, but in two of the five charts, no referral was documented. The data from the chart audit revealed that there was a lack of information about whether certain patients (35%) needed to be referred because there was no documentation that screening had been done.

In order to evaluate whether the educational feedback intervention produced a significant change in clinical practice, the project leader conducted a post-intervention chart review to audit the number of referrals made by providers. Overall, 49 charts \((n = 49)\) were collected during the post-intervention chart audit, after the 30-day retrospective
timeframe (May 1, 2017 to June 1, 2017). Out of the total 49 charts, it was documented that 31 patients (or 63%) were appropriately screened using the PHQ-9. The post-intervention chart audit demonstrated that depression screening had not been documented on 18 patients, revealing that 37% of charts showed no documentation of the PHQ-9 being administered. There were a total of 26 patient charts that documented appropriate screening and that showed the patients did not meet referral qualifications (less than 10 points on the PHQ-9), indicating that 84% of patients who had been screened did not meet criteria for referral. Out of the 31 charts audited that documented PHQ-9 screening, five individuals (16%) met criteria for referral based on the AHA guidelines. Documentation showed that three out of the five patients were referred to the in-house counselor and two had no documentation that a referral had been made, indicating that the increase in referrals from pre- to post-intervention did not change. From a statistical point of view, the PHQ-9 was used 32 out of 49 times in the pre-intervention group and 31 out of 49 times in the post-intervention group, which shows a slight decrease in the usage of the screening instrument.

Both the pre-intervention and post-intervention data were collected and examined using SPSS, by applying the Two-Proportions Test and the Fisher’s Exact Test. There was no statistically significant difference between the pre- and post-intervention data. The Fisher’s Exact Test was used to assess the correlation, interaction, and comparison between the pre- and post-intervention data to evaluate if provider referrals increased after the educational feedback session. Of those providers who documented the use of the PHQ-9 screening instrument, met the AHA’s criteria, and made a referral based on the results, the $p$ value was 0.738, with the alternative hypothesis of $p_2 > p_1$. Based on this information, there was no evidence that the percentage of referrals had increased after the educational feedback intervention.
The Two-Proportions Test compared the percentages of the pre- and post-intervention population to assess whether there was improvement in the usage of the PHQ-9. There was no indication that the utilization of the PHQ-9 screening tool had increased after conducting the educational feedback intervention. Comparing the pre- and post-intervention usage of the PHQ-9 screening instrument, using the Two-Proportions Test, the $p$ value was 0.584, with the alternative hypothesis of $p_2 > p_1$. These statistics indicated that there was no evidence that the application of the depression-screening instrument was affected by the feedback intervention.

After the second chart audit, the project leader gave feedback to the providers of the outpatient cardiology practice in an effort to motivate them to adopt the previously discussed objectives using the AHA guidelines on depression screening. Despite the fact that there was no difference between the pre- and post-intervention data collected from a statistical perspective, this project still holds significant clinical value to the practice setting due to the specific link between depression and MIs. The ultimate goal is to encourage practice change. Various unforeseen factors existed throughout each phase of the project. In the subsequent paragraphs, limitations of the project are considered and recommendations regarding how to make improvements for future implementation and adoption of the practice change are addressed.

**Project Limitations**

Limitations to the scholarly project included the following: (a) timing of the project within the outpatient setting, (b) number of charts collected during the pre- and post-intervention timeframe, (c) omitted or limited documentation in the post-MI follow-up clinic notes, (d) misplaced charts, (e) unreported information, (f) deviation of referrals in the correct location, (g) incomplete retrieval of research, (h) lack of attention and engagement of providers, and (i) multiple changes within the practice setting during the pre- and post-intervention. Another
limitation was the fact that the project focused solely on patients, post-MI. This same type of project has the potential to be applicable and beneficial to the remainder of the cardiovascular population within the outpatient setting. Risk of bias and time constraints on the part of the project leader were other possible limitations.

In regard to choosing a nonrandom purposive sampling technique, limitations included an unspecified proportion and lack of representation of the total population (Dudovskiy, 2016). There could also have been a reduced equivalent of generalization of outcomes in comparison to probability sampling (Dudovskiy, 2016). With a nonrandom purposive sampling method, there are potential problems in assessing sampling variability and recognizing potential bias (Dudovskiy, 2016). Certain patients within the sample population (based on the inclusion and exclusion criteria) could have been incorporated but may have been overlooked during the process of auditing charts.

Two separate meetings were conducted for the cardiology providers, which could be viewed as a limitation, even though it was still an aggregate approach. At least two of the planned meetings were cancelled and shifted to later dates due to various reasons and unforeseen circumstances within the practice setting. The first meeting was exclusively cardiologists and took place at the beginning of the week. The second meeting occurred within the same week, but three days later, and contained APPs only. Both groups did receive the same Power Point presentation and evidence-based educational handout in order to maintain consistency.

Several of these unanticipated issues could have been avoided in a variety of ways. In order to make advancement for future practice, the following tactics are recommended in order to improve the pre/post-intervention data collection, educational performance feedback session, and continued follow-up: (a) selecting a better timeframe in which to conduct the educational
feedback session in order to increase engagement, attention, and adoption; (b) having the ability to incorporate a question and feedback session within the educational performance intervention; (c) merging other practice changes together to improve adoption and compliance among providers; (d) following up and maintaining consistency in smaller group settings (or one-on-one) to enhance engagement and adoption of the practice changes; (e) having additional educational feedback discussions; (f) administering evaluations to the providers to assess their knowledge prior to and after the interventions; (g) assessing provider perceptions and attitudes in regard to this topic; and (h) evaluating whether the information reviewed aided the providers and in what areas certain improvements or advances could be made. Another recommendation involves delivering more effective techniques in discussing the priority of screening for depression in the MI population as well as emphasizing its cost-effectiveness within the outpatient setting. Future research must be done in regard to these recommendations as well as assessing the hospital re-admission rates in this specific group of patients. Each one of these suggestions should be addressed to improve engagement among providers and adoption of the practice change for future application. These recommendations will assist in raising provider awareness and screening for depression as well as increasing the number of referrals made based on the AHA guidelines. The ultimate goal is to improve outcomes and quality of life for each patient cared for within the outpatient setting.

**Significance and Implications for Practice**

The project leader anticipated that this project would result in more consistent provider referrals to the in-house counselor or primary care physician for patients post-MI who screened positive for depression using the PHQ-9 tool. Even though there was no referral increase, one of the desired goals was for the cardiology providers to have a better awareness of depression as a
marker of poor outcomes, specifically an increased risk for further myocardial infarctions, stroke, transient ischemic attack, heart failure, or death. This project revealed a variety of opportunities within the outpatient practice to further educate and inform the providers on the importance of screening for depression, reviewing the PHQ-9 results, and increasing the number of referrals. These AHA guidelines were recognized and have been established since 2008. The greatest lessons learned included the need to target provider knowledge, perceptions, and attitudes regarding the AHA guidelines and the PHQ-9 tool, with an emphasis on identifying at-risk patients for depression, post-MI.

Alternative approaches for future practice improvement revealed the need to target the nursing population. Nursing staff are responsible for administering the PHQ-9 screening tool for patients to complete prior to being evaluated by a cardiology provider, on the initial post-MI follow-up visit, post-hospitalization. The necessity for an improved protocol and process change has been identified within the outpatient setting among providers, focusing on integrating the nursing population. It is essential for the nurses to ensure the screening tool is being administered to all patients post-MI, in addition to alerting providers if an individual scores ten points or greater on the PHQ-9. This has been acknowledged as one of the contributing factors for patients not being identified or screened according to the guidelines. Education must be targeted towards the nursing population in order to develop and to create a better understanding and knowledge base in regard to the significance of depression associated post-MI, the AHA guidelines, and the PHQ-9 tool.

As a result of this project’s implementation, it was discovered the project leader delivered important information and education to the cardiology providers on the significance of screening for depression and referring appropriately, in an effort to narrow the gap in knowledge,
ultimately in an attempt to improve outcomes and quality of life in patients post-MI. These practice implications identified existing gaps of provider perception in regard to the need to improve interprofessional collaboration, adhere to the AHA guidelines, and cultivate process changes within the current protocol. Through the use of this chart audit it was discovered that there was no documentation of screening using the PHQ-9 on 35% of patients in the pre-intervention and 37% in the post-intervention. Adjustments and strategies must be implemented with a focus on provider knowledge, perceptions, and attitudes, the need to target the nursing population, and improved preparation and understanding of this process change based on this project’s implications to practice.

Dissemination Plan

The findings will be disseminated to the organizations involved in this project with a lessons learned report through the use of a poster presentation and educational handout discussing the results of increasing the number of referrals for patients, post-MI who screen positive for depression. Other anticipated methods to disseminate the findings include a podium presentation and manuscript publication. Disseminating the findings from this project could potentially include any of the following methods: academic journals, book chapters, technical reports, trade magazines, regular newspapers, radio or television interviews, websites, stakeholders, clinical specialty associations, and professional conferences or meetings (Agency for Health Care Research and Quality [AHRQ], 2014).
References


Williams, R. (2011). Depression after heart attack: Why should I be concerned about depression after a heart attack? *Circulation, 123*(25), e639-40. doi:10.1161/CIRCULATIONAHA.110.017285


Appendix A

Master List Template

**Master List: Provider Identification**
Template for Excel Spreadsheet
To Be Converted to Password Protected PDF

<table>
<thead>
<tr>
<th>Provider Name</th>
<th>Assigned Provider ID Code</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Master List: Chart Identification**
Template for Excel Spreadsheet
To Be Converted to Password Protected PDF

<table>
<thead>
<tr>
<th>Provider ID Code</th>
<th>Chart Record Number</th>
<th>Assigned Chart ID Code</th>
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</tr>
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</table>
Appendix B

Chart Audit Tool

<table>
<thead>
<tr>
<th>Chart ID Code</th>
<th>Referral(s) made: Specify where</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient Age (years)</td>
<td>Provider ID Code</td>
</tr>
<tr>
<td>ICD-10</td>
<td>Provider Category Code</td>
</tr>
</tbody>
</table>

Check if referrals are being made for patients who have screened positive for depression in the post-AMI population - documented (written or verbal) to the patient in the patient encounter (depression screening tool).

<table>
<thead>
<tr>
<th>Met</th>
<th>Unmet</th>
<th>Educational Element</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Assessment of depression during post-AMI follow-up (Element 1).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Utilization of PHQ-2/-9 depression screening tool (Element 2).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Indication and use of PHQ-2/-9 as the depression-screening tool according to AHA guidelines (Element 3).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Specific algorithm recommended by AHA guidelines (Element 4).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Depression therapeutic plans recommended by the AHA guidelines (Element 5).</td>
</tr>
</tbody>
</table>
Explanation(s):

1. Description of depression in patients, post-AMI and the importance of screening.

2. Provider utilization of AHA’s guidelines to screen for depression in patients, post-AMI on follow-up visits.

3. Indication and use of each PHQ-2/-9 depression-screening tool. (At a minimum screen with PHQ-2 and if the response is “yes” to one or both questions, than the PHQ-9 should be implemented).

4. Algorithm developed by the AHA in screening for depression in patients. (Severity score indications).

5. Specific depression treatment option(s) recommendation (Referral to primary care physician, in-house counselor, and/or H2O (Hospital-to-Office) clinic; individualized plan includes: antidepressant medications, cognitive behavioral therapy, and physical activity such as aerobic exercise and cardiac rehabilitation).
Appendix C

Documentation Spreadsheet Template

**Depression post-AMI Documentation Spreadsheet Template**

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<th>Provider ID Code</th>
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<th>Provider Category Code (0 = NP, 1 = PA)</th>
<th>Chart ID Code</th>
<th>Age (Years; if age between 18-89 years old)</th>
<th>Age Categorical &gt; 89 years old</th>
<th>PHQ-2-9 used</th>
<th>Criteria Met (&gt;3)</th>
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<td></td>
<td></td>
<td>Criteria Met (&gt;3)</td>
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Appendix D

Letter of Support from Medical Director

Stroobants Cardiovascular Center of Lynchburg is committed to providing the most advanced, comprehensive care for our patients, facilitated by the pursuit of quality improvement. Mrs. Vasioutovitch’s Doctor of Nursing Practice Scholarly Project aligns with our commitment that every patient receives the ultimate quality health care.

Stroobants Cardiovascular Center of Lynchburg is pleased to support Mrs. Vasioutovitch’s Doctor of Nursing Practice Scholarly Project: Screening for Depression in Acute Myocardial Infarction Patients: An Evidence-Based Project.

Please feel free to contact me if I can be of further assistance.

Respectfully,

Chad Hoyt, M.D.
Medical Director of Stroobants Cardiovascular Center

Centra Heart & Vascular Center
(434) 200-5252
Appendix E

IRB Approval from Liberty University

November 30, 2016

Heather Vasioutovitch
IRB Application 2683: Screening for Depression in Acute Myocardial Infarction Patients: An Evidence-Based Project

Dear Heather Vasioutovitch,

The Liberty University Institutional Review Board has reviewed your application in accordance with the Office for Human Research Protections (OHRP) and Food and Drug Administration (FDA) regulations and finds your study does not classify as human subjects research. This means you may begin your research with the data safeguarding methods mentioned in your IRB application.

Your study is not classified as human subjects research because evidence-based practice projects are considered quality improvement activities, which are not considered “research” according to 45 CFR 46.102(d).

Please note that this decision only applies to your current research application, and any changes to your protocol must be reported to the Liberty IRB for verification of continued non-human subjects research status. You may report these changes by submitting a new application to the IRB and referencing the above IRB Application number.

If you have any questions about this determination or need assistance in identifying whether possible changes to your protocol would change your application’s status, please email us at irb@liberty.edu.

Sincerely,

G. Michele Baker, MA, CIP
Administrative Chair of Institutional Research
The Graduate School

Liberty University | Training Champions for Christ since 1971
Appendix F

IRB Approval from Centra

<table>
<thead>
<tr>
<th>Checklist Statements</th>
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<th>Not True</th>
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</thead>
<tbody>
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<td></td>
<td></td>
</tr>
<tr>
<td>1. The research will only be conducted in established or commonly-accepted educational settings including but not limited to schools and colleges. (May include other sites where educational activities regularly occur.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. The research will involve only normal educational practices, such as (i) research on regular and special education instructional strategies, or (ii) research on the effectiveness of or the comparison among instructional techniques, curricula, or classroom management methods.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. The research will not involve individuals as participants who are known to be prisoners.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. The research is not subject to FDA regulations.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Category 2 – For Educational Tests, Surveys, Interviews, Public Behavior Observation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. The research will involve only the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Address statement 6 only if the research will involve children as participants. If children will NOT participate, check N/A and continue with statement 7.</strong></td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>6. The procedures will be limited to the use of educational tests (cognitive, diagnostic, aptitude, achievement) or observation of public behavior where the investigator will NOT participate in the activities being observed.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. The information obtained from educational tests, survey procedures, interview procedures or observation of public behavior will be recorded in such a manner that human subjects CANNOT be identified, directly or through identifiers linked to the subjects.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&quot;True&quot; to either statement 7 or 8 will qualify for exemption provided that statements 9 and 10 are true.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Any disclosure of the human subjects’ responses outside the research could NOT reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects’ financial standing, employability, or reputation.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. The research will not involve individuals as participants who are known to be prisoners.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. The research is not subject to FDA regulations.</td>
<td></td>
<td></td>
</tr>
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</table>
Observation of Public Officials:

11. The research will involve only the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior AND the human subjects are elected or appointed public officials or candidates for public office. (Applies to senior officials such as mayor or school superintendent rather than a police officer or teacher.)

"True" to either statement 11 or 12 will qualify for exemption provided that statements 13 and 14 are true.

12. The research will involve only the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior AND federal statute(s) require without exception that the confidentiality of the personally identifiable information will be maintained throughout the research and thereafter.

13. The research will not involve individuals as participants who are known to be prisoners.

14. The research is not subject to FDA regulations.

Category 4 – For Existing Data, Documents and Specimens:

15. The research will involve only the collection or study of existing data, documents, records, pathological specimens, or diagnostic specimens. ("Existing" means existing before the research is proposed to be IRB to determine whether the research is exempt. All materials to be reviewed currently exist at the time of this exemption request.)

16. The sources of the existing data, documents, records or specimens are publicly available OR the information will be recorded by the investigator in such a manner that participants cannot be readily identified either directly or through identifiers (such as a code) linked to them.

17. The research will not involve individuals as participants who are known to be prisoners.

18. The research is not subject to FDA regulations.

Category 5 – For Public Benefit or Service Programs (Federal):

19. The project is a research or demonstration project conducted by or subject to the approval of a (federal) Department or Agency head and which is designed to study, evaluate, or otherwise examine: (i) public benefit or service programs; (ii) procedures for obtaining benefits or services under those programs; (iii) possible changes in or alternatives to those programs or procedures; or (iv) possible changes in methods or levels of payment for benefits or services under those public benefit or service programs.

20. The research will not involve individuals as participants who are known to be prisoners.

21. The research is not subject to FDA regulations.

22. The program under study delivers a public benefit (e.g., financial or medical benefits as provided under the Social Security Act) or service (e.g., social, supportive, or nutrition services as provided under the Older Americans Act).

23. The research or demonstration project will be conducted pursuant to specific federal statutory authority.

24. There is no statutory requirement that the project be reviewed by an IRB.

25. The project does not involve significant physical invasions or intrusions upon the privacy of participants.

26. The exemption has authorization or concurrence by the funding agency.

Category 6 – For Taste and Food Quality and Consumer Acceptance Studies:

27. The research involved only a taste and food quality evaluations or a food consumer acceptance study in which (i) wholesome foods without additives will be consumed OR (ii) food will be consumed that contains a food ingredient, agricultural chemical or environmental contaminant that is at or below the level found to be safe by the Food and Drug Administration or is approved by the Environmental Protection Agency or the Food Safety and Inspection Service of N/A N/A
<table>
<thead>
<tr>
<th>The U.S. Department of Agriculture.</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>28. The research will not involve individuals as participants who are</td>
<td></td>
</tr>
<tr>
<td>known to be prisoners.</td>
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<tr>
<td>Emergency Use of an Unapproved Test Article (i.e., a drug, device</td>
<td>N/A N/A</td>
</tr>
<tr>
<td>or biologic that is not FDA-Approved)</td>
<td></td>
</tr>
<tr>
<td>The activity involves emergency use of an investigational drug, device</td>
<td>N/A N/A</td>
</tr>
<tr>
<td>or biologic. Such an activity is not exempt from IRB review. However,</td>
<td></td>
</tr>
<tr>
<td>this emergency use may occur prior to IRB review and approval (see</td>
<td></td>
</tr>
<tr>
<td>Category A and B in the Emergency Use Policy for details.) Note that</td>
<td></td>
</tr>
<tr>
<td>such an emergency use must be reported to the IRB within five</td>
<td></td>
</tr>
<tr>
<td>business days.</td>
<td></td>
</tr>
<tr>
<td>The activity does not meet with DHHS definition of “research.”</td>
<td>N/A N/A</td>
</tr>
<tr>
<td>Criteria that must be met for the research to be determined to be</td>
<td></td>
</tr>
<tr>
<td>consistent with IRB ethical standards</td>
<td></td>
</tr>
<tr>
<td>The research holds out no more than minimal risk to subjects.</td>
<td></td>
</tr>
<tr>
<td>Selection of subjects is equitable.</td>
<td></td>
</tr>
<tr>
<td>If there is recording of identifiable information, there are adequate</td>
<td></td>
</tr>
<tr>
<td>provisions to maintain the confidentiality of the data.</td>
<td></td>
</tr>
<tr>
<td>If there are interactions with subjects:</td>
<td></td>
</tr>
<tr>
<td>There will be a consent process (and maybe some type of</td>
<td></td>
</tr>
<tr>
<td>documentation) that will disclose such information as:</td>
<td></td>
</tr>
<tr>
<td>• That the activities involve research.</td>
<td></td>
</tr>
<tr>
<td>• The procedures to be performed.</td>
<td></td>
</tr>
<tr>
<td>• That participation is voluntary.</td>
<td></td>
</tr>
<tr>
<td>• Name and contact information for the investigator.</td>
<td></td>
</tr>
<tr>
<td>There are adequate provisions to maintain the privacy interests of</td>
<td></td>
</tr>
<tr>
<td>subjects.</td>
<td></td>
</tr>
</tbody>
</table>

Signature of Principal Investigator: Heather Vasiliouovich

Type my name on the line above constitutes an electronic signature.

Printed Name: Heather Vasiliouovich

Date 1/20/2016

FOR THE IRB REVIEWER ONLY:

Is the activity exempt? YES [X] NO [ ]

Does the research meet the standards of ethical conduct? YES [X] NO [ ]

Which exemption category or categories apply to the activity? Category 2

Approved by IRB Exempt Committee (date): 1/9/2017

Signature of IRB Reviewer:

Type my name on the line above constitutes an electronic signature.

Printed Name: Linda Jenkins, Ellen Morrison, Nicky Brunet

Date 1/9/2017

Centra Health IRB Exempt Research Checklist Version 4, 15NOV2016
Appendix G

Permission to Use the Iowa Model (1998 and 2015)

Permission to Use and/or Reproduce The Iowa Model (1998)

You have permission, as requested today, to review/use the 1998 Iowa Model of Evidence-Based Practice to Promote Quality Care. Click the link below to open.

Copyright of The Iowa Model of Evidence-Based Practice to Promote Quality Care will be retained by The University of Iowa Hospitals and Clinics.

Permission is not granted for placing the Iowa Model on the internet.

The Iowa Model - 1998.

Citation: Titler, M., Kleiber, C., Steelman, V., Rakel, B.A., Budreau, G., Everett, L.Q., ... Goode, C.J. (2001). The Iowa Model of Evidence-Based Practice to Promote Quality Care. Critical Care Nursing Clinics of North America, 13, 491-509.

In written material, please add the following statement:

- Used/Reprinted with permission from the University of Iowa Hospitals and Clinics. Copyright 1998. For permission to use or reproduce the model, please contact the University of Iowa Hospitals and Clinics at 319-384-9098.

If you have questions, please contact Kimberly Jordan at 319-384-9098 or kimberly-jordan@uiowa.edu.

Permission to Use and/or Reproduce The Iowa Model (2015)

You have permission, as requested today, to review/use The Iowa Model Revised: Evidence-Based Practice to Promote Excellence in Health Care (Iowa Model). Click the link below to open.

Copyright will be retained by The University of Iowa Hospitals and Clinics.

Permission is not granted for placing the Iowa Model on the internet.

The Iowa Model - 2015.

Citation: The Iowa Model Collaborative. (in review). The Iowa Model Revised: Development and Validation.

In written material, please add the following statement:

- Used/Reprinted with permission from the University of Iowa Hospitals and Clinics. Copyright 2015. For permission to use or reproduce, please contact the University of Iowa Hospitals and Clinics at 319-384-9098.

If you have questions, please contact Kimberly Jordan at 319-384-9098 or kimberly-jordan@uiowa.edu.
Appendix H

Confirmation to Use, Reproduce, Display, and/or Distribute PHQ

Screener Overview

Recognizing signs of mental health disorders is not always easy. The Patient Health Questionnaire (PHQ) is a diagnostic tool for mental health disorders used by health care professionals that is quick and easy for patients to complete. In the mid-1990s, Robert L. Spitzer, MD, Janet B.W. Williams, DSW, and Kurt Kroenke, MD, and colleagues at Columbia University developed the Primary Care Evaluation of Mental Disorders (PRIME-MD), a diagnostic tool containing modules on 12 different mental health disorders. They worked in collaboration with researchers at the Regenstrief Institute at Indiana University and with the support of an educational grant from Pfizer Inc. During the development of PRIME-MD, Drs. Spitzer, Williams and Kroenke, created the PHQ and GAD-7 screeners.

The PHQ, a self-administered version of the PRIME-MD, contains the mood (PHQ-9), anxiety, alcohol, eating, and somatoform modules as covered in the original PRIME-MD. The GAD-7 was subsequently developed as a brief scale for anxiety. The PHQ-9, a tool specific to depression, simply scores each of the 9 DSM-IV criteria based on the mood module from the original PRIME-MD. The GAD-7 scores 7 common anxiety symptoms. Various versions of the PHQ scales are discussed in the Instruction Manual.

All PHQ, GAD-7 screeners and translations are downloadable from this website and no permission is required to reproduce, translate, display or distribute them.
Appendix I

CITI Certificate

COLLABORATIVE INSTITUTIONAL TRAINING INITIATIVE (CITI PROGRAM)
COMPLETION REPORT - PART 1 OF 2
COURSEWORK REQUIREMENTS*

* NOTE: Scores on the Requirements Report reflect quiz completions at the time all requirements for the course were met. See list below for details. See separate Transcript Report for more recent quiz scores, including those on optional (supplemental) course elements.

- Name: Heather Vazeliotis (ID: 4440734)
- Email: hvazeli@liberty.edu
- Institution Affiliation: Liberty University (ID: 2446)
- Institution Unit: Nursing
- Curriculum Group: IRB Members - Basic/Refresher
- Course Learner Group: IRB Members & IRB Staff
- Stage: Stage 1 - Basic Course
- Description: This Basic Course is appropriate for IRB or Ethics Committee

- Report ID: 18457379
- Completion Date: 13-Sep-2016
- Expiration Date: 13-Sep-2018
- Minimum Passing: 80
- Reported Score*: 94

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<th>DATE COMPLETED</th>
<th>SCORE</th>
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<td>Avoiding Group Harms - U.S. Research Perspectives (ID: 14060)</td>
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<td>Avoiding Group Harms - International Research Perspectives (ID: 14081)</td>
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<td>Cultural Competence in Research (ID: 15166)</td>
<td>11-Sep-2016</td>
<td>5/5 (100%)</td>
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<td>Belmont Report and CITI Course Introduction (ID: 1127)</td>
<td>02-Oct-2014</td>
<td>3/3 (100%)</td>
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<td>5/5 (100%)</td>
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<td>Defining Research with Human Subjects - SBE (ID: 491)</td>
<td>11-Sep-2016</td>
<td>4/5 (80%)</td>
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<td>The Federal Regulations - SBE (ID: 502)</td>
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<td>5/5 (100%)</td>
</tr>
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<td>Basic Institutional Review Board (IRB) Regulations and Review Process (ID: 2)</td>
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<td>5/5 (100%)</td>
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<td>Informed Consent (ID: 3)</td>
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<td>4/5 (80%)</td>
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<td>5/5 (100%)</td>
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<tr>
<td>Research with Children - SBE (ID: 507)</td>
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<td>Liberty University (ID: 15111)</td>
<td>02-Oct-2014</td>
<td>No Quiz</td>
</tr>
</tbody>
</table>

For this Report to be valid, the learner identified above must have had a valid affiliation with the CITI Program subscribing institution identified above or have been a paid independent learner.


CITI Program
Email: support@citiprogram.org
Phone: 866-229-5929
Web: [https://www.citiprogram.org](https://www.citiprogram.org)
COLLABORATIVE INSTITUTIONAL TRAINING INITIATIVE (CITI PROGRAM)

COMPLETION REPORT - PART 2 OF 2

COURSEWORK TRANSCRIPT**

** NOTE: Scores on this Transcript Report reflect the most current quiz completions, including quizzes on optional (supplemental) elements of the course. See list below for details. See separate Requirements Report for the reported scores at the time all requirements for the course were met.

- Name: Heather Vosbludwich (ID: 4440794)
- Email: hvos@liberty.edu
- Institution Affiliation: Liberty University (ID: 2446)
- Institution Unit: Nursing
- Curriculum Group: IRB Members - Basic/Refresher
- Course Learner Group: IRB Members & IRB Staff
- Stage: Stage 1 - Basic Course
- Description: This Basic Course is appropriate for IRB or Ethics Committee
- Report ID: 14413769
- Report Date: 13-Sep-2018
- Current Score**: 90

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<td>Students in Research (ID: 1321)</td>
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<td>Avoiding Group Harms - International Research Perspectives (ID: 14081)</td>
<td>11-Sep-2016</td>
<td>3/3 (100%)</td>
</tr>
<tr>
<td>Basic Institutional Review Board (IRB) Regulations and Review Process (ID: 2)</td>
<td>12-Sep-2016</td>
<td>5/5 (100%)</td>
</tr>
<tr>
<td>Recognizing and Reporting Unanticipated Problems Involving Risks to Subjects or Others in Biomedical Research (ID: 14777)</td>
<td>11-Sep-2016</td>
<td>5/5 (100%)</td>
</tr>
<tr>
<td>Populations in Research Requiring Additional Considerations and/or Protections (ID: 10600)</td>
<td>12-Sep-2016</td>
<td>4/5 (80%)</td>
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</table>
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