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Alzheimer’s Dementia Screening in Primary Care: Quality Improvement Project to Identify Those at Risk

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Alzheimer’s Dementia Screening in Primary Care:

Quality Improvement Project to Identify Those at Risk

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Abstract

Background: Identifying Mild Cognitive Impairment (MCI) and Alzheimer’s Dementia (AD) in the Primary Care Practice (PCP) setting can initiate intervention early, before negative consequences occur including decreased quality of life and caregiver burden.

Purpose: To identify individuals at risk for AD and initiate early treatment and intervention.

Methods: The Montreal Cognitive Assessment (MoCA) and Functional Activities Questionnaire (FAQ) were used as screening tools; adults age 65 and older were participants.

Implementation Procedure: Within the Internal Medicine Clinic, the standard annual wellness visits include Registered Nurses that administer a Mini-Cog screening tool with the patients. The Mini-Cog is a brief screening tool that is currently used in practice to screen for cognitive impairment using memory recall and a clock drawing test. The DNP student and Registered Nurses in the clinic, who have been trained by the DNP student, administered the MoCA and FAQ to participants who scored poorly on the Mini-Cog test during their annual wellness visits.

Results: With a two-tiered process instated, the sensitivity and specificities were improved with patients that failed the Mini-Cog and then went on to do screenings using the MoCA/FAQ.

Discussion: It is recommended to use the two-tiered process to initiate further screening with the MoCA/FAQ if a patient fails the Mini-Cog screening.

Implications into Practice and Conclusions: In practice, this may help to more efficiently and effectively screen for cognitive impairment and help patients receive referrals and/or further testing in a timely manner.

Keywords: Alzheimer’s, Alzheimer’s screening, outpatient, primary care practice, Alzheimer’s screening cognitive test, 65+ years.
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**Introduction**

Alzheimer’s Dementia (AD) is continuing to grow in prevalence as the population ages both at the national and international levels (Alzheimer's Association, 2015). Most patients with dementia receive medical care in the primary care setting, but caregivers and primary care practitioners often fail to recognize and respond to dementia symptoms (McCarten et. al, 2012). Dementia diagnosis can be delayed due to the need for extensive workups and diagnostics as well as time constraints and limited resources. Dementia is different than other diagnoses because those who are affected often do not recognize the signs and symptoms due to the disease process. Recognizing symptoms is also different from the process of dementia screening. A screening process is a specific type of testing that is conducted on a specified population (for example, adults age 65 or older) regardless of symptoms or suspicion of disease from caregivers or providers (Brayne, Fox, & Boustani, 2007). A systematic screening process that is validated nationally by a set of Alzheimer’s-specific guidelines will help to identify those patients at risk for or with AD. Early screening and intervention by primary care providers can have an important impact that includes reducing distress in caregivers and reducing behavioral symptoms in individuals with dementia (Brodaty & Arasaratnam, 2012). Current geriatric health care policy should focus on the prevention and early identification of high risk/new onset cognitive changes, which may potentially lead to improved quality of life for dementia patients and their families/caregivers (Gitlin, 2012).
Background

AD is the sixth leading cause of death in the United States and the fifth leading cause of death in Americans of age 65 and older (Aigbogun, Stellhorn, Krasa, & Kostic, 2017; Alzheimer’s Disease International, 2011; Thies & Blellar, 2012; National Institutes of Health, 2013). There is significant financial impact that comes with this increased incidence. Medicare payments for AD beneficiaries are three times greater than Medicare payments without AD beneficiaries. For Medicaid, it is 19 times as great (Alzheimer’s Association, 2015; Thies & Blellar, 2012). Costs are expected to continue to rise, and Social Security is not replacing this money for Medicare and Medicaid fast enough to fill the need. In 2016, total direct costs for persons with AD and dementia was estimated at $236 billion (Aigbogun, Stellhorn, Krasa, & Kostic, 2017). It is projected that, by 2050, Medicare costs will be estimated around $1 trillion (Brayne, Fox, & Boustani, 2007).

The State of Minnesota has taken direct action in an effort to improve the future for Alzheimer’s patients and to curb costs associated with dementia. In 2009, the Minnesota Legislature charged the Minnesota Board on Aging with establishing the Alzheimer’s Disease Working Group (ADWG) to make policies and programs in preparation for the future. The ADWG developed recommendations for legislature by 2011. Based on this, the organization ACT on Alzheimer’s was formed. It is an organization that tracks and maintains clinical and financial impacts of Alzheimer’s and dementia in the state of Minnesota. The economic model tracks individuals as they move through various and diminishing health states and the accumulative costs that are accrued (Folds & Long, 2014). Investing in early prevention programs may lead to significant decreased health care cost both nationally and within the state of Minnesota that can be tracked primarily to early screening. These measures not only reduce
the costs for insurances and governmental costs, but also reduce individual facility costs both in primary and long-term care settings. Early prevention in patients can lead to longer life, increased quality of life, and decreased caregiver burden. Prevention and recognition is initiated as a result of screening.

Because of lack of awareness of current evidence-based screening practices as well as treatment options for AD, primary care providers often miss the symptoms of AD due to the lack of understanding the current medical therapies available for dementia (Cordell et al. 2013). Screening individuals during annual wellness visits can help to identify these patients and promote early intervention. Nurses are in an ideal position as their relationships with patients are based on trust and their consistent interactions with older adults and their families. This trust yields the information for assessment and to conduct AD screenings. Once patients are identified as at-risk, providers can present information to both patients and caregivers towards treatment options, further testing, and some possible ways of slowing down the progression of the disease. Then they are able to offer individualized interventions, which are shown to be more effective at earlier onset, and help patients to make difficult decisions regarding their future care while they still have that capacity.

One type of intervention that providers may recommend is medication management. The medications that are approved in the United States for AD are typically symptom management medications. Many medications have increased efficacy the earlier treatment begins (Brayne, Fox, & Boustani, 2007). Throughout the years, antipsychotic medications have been used in an attempt to alleviate behavior disturbances that oftentimes plague those with dementia. Using antipsychotics, however, can increase rates of mortality, Parkinsonism, tardive dyskinesia, diabetes, and cerebrovascular events (Kales, Zivin, Kim, et al., 2011). Currently, there are five
drugs that have been approved by the U.S. Food and Drug Administration for treatment of Alzheimer’s and/or to prevent or slow progression of the disease. Drugs used to treat the cognitive symptoms include Aricept, Exelon, Razadyne, and Cognex. Namenda is another medication that works somewhat differently in targeting the NMDA-receptors and acts as an antagonist. Usually, Namenda is the only medication of these that has shown some benefits in the later stages of dementia while the others have shown some benefits if started in the early stages. (Kumar, Singh, & Ekavali, 2015). In addition to the many approved medications for symptom management, there are also trial medications being researched in studies funded by the National Institutes of Health (NIH). Other trials taking place nationally include anti-amyloid-beta interventions, which are thought to help earlier forms of Alzheimer’s (early-onset), as well as Alzheimer’s patients who are believed to have buildup of amyloid plaque in the brain. Amyloid plaque is thought to interfere with the brain cells, and these medications are showing some encouraging results (NIH, 2012).

Offering screening to individuals age 65 and older who may have Mild Cognitive Impairment (MCI) and do not yet have AD will also help to identify at-risk individuals since MCI can be a precursor or leading risk factor for development of AD (Albert et al., 2011). While it is not definitive that MCI will become AD, it is something that providers should investigate for a cause. If no medical or psychiatric condition is determined to be contributing and if it is determined to be MCI, further monitoring is warranted.

There are several guidelines for diagnosing MCI, including those from the National Institute on Aging-Alzheimer’s Association (NIA-AA) (Albert et al., 2011), Diagnostic and Statistical Manual of Mental Disorders (5th edition; DSM-V) (American Psychological Association), and the International Work Group (IWG) (Dubois et al., 2010). Regardless of the
guideline that is used, MCI is identified as a risk factor for Alzheimer’s disease. While some patients do not progress and some even improve cognition, it is important to identify these individuals early and follow their progress as well as offer any needed interventions. These are patients who benefit from earlier recognition through screening, and, although the screenings can be offered, there is still a lack of this being done to the full potential in primary care practices. Therefore, by implementing consistent screening, Alzheimer’s patients identified earlier can ensure improved quality of life, lower health care costs, and decreased caregiver burdens.

Problem Statement

The risk of increased morbidity and earlier mortality for persons aged 65 years and older secondary to diagnosis of AD is evidenced by increased incidence and prevalence of diagnosis of AD in the baby boomer population and others living to older ages. AD is associated with pronounced cognitive decline, physiologic sequelae, and decreased quality of life. Lack of early screening and delayed effective intervention for AD by providers can contribute to a more prolonged and significant course. A quality improvement project was implemented for individuals age 65 years and older in the primary care setting with the goal of increasing the use and efficacy of AD Screening. The screening tools used were a combination of the MoCA (Appendix A) and the FAQ (Appendix B) screening tools.

Organizational “Gap” Analysis of Project Site

The community of interest (COI) included people age 65 and over and within an adult primary care Internal Medicine Clinic. This clinic is located in Duluth, MN, where there are more than 19,000 patients and seven physicians. There are annual wellness visits conducted almost daily and usually several within the day. These are visits paid by Medicare where the patient sees a nurse and discusses his or her daily routines and lifestyle. Encouragement,
education, and modifications are discussed between the nurse and the patient involving physical activity, healthy eating, stress reduction, safety in the home, and resources for services. There is also a Mini-Cog exam that is performed (Appendix C) and scored out of five points. The Mini-Cog is a screening tool that is used to assess any basic cognitive limitations or decline. However, there is no further testing that is performed if the patient has a low score or scores poorly on the Mini-Cog screening, but the results are given to the physician to decide how to further investigate the findings. On site in this facility are pharmacists, nursing staff, and scheduling staff. The facility is adjacent to the hospital in the event a patient may need transport to a higher level of care. There are many different specialty offices, radiology, and an infusion center next to this office if these services are needed for patients.

This QI project aimed to help to identify at-risk individuals who are age 65 and older who may not otherwise receive a risk assessment for Alzheimer’s Dementia. The project goals included bringing about meaningful change by having clinics begin to implement routine dementia screening for older adults.

The screening tools that were used were a combination of the MoCA and FAQ screening tools. Using these two screening tools together can be more accurate, effective, and precise in identifying at-risk dementia patients (Cruz-Orduña et al., 2012). The Internal Medicine site in Duluth, MN currently uses these screening tools only when the provider specifically decides to perform them. There are annual wellness exams that are given where the patient sees the nurse, and they have a Mini-Cog screening performed. Thus, there exists an opportunity to go one step further. If the patient performs poorly on the Mini-Cog, the next step would be to use the MoCA and FAQ screening tools (Nasreddine, Phillips, & Chertkow, 2012; Pfeffer, Kurosaki, Harrah, Chance, & Filos, 1982). This would also save time and effort for the providers. Although many
of the patients are in the age groups that are seen at the clinic site, there is not much emphasis placed on screening or dementia care.

**Review of the Literature**

**Method**

A comprehensive search of the literature for AD evidence included the following databases: PubMed of the National Library of Medicine, Cochrane, and Cumulative Index to Nursing and Allied Health Literature (CINAHL). The following Medical Subject Headings (MeSH) terms were used for the PubMed search: Alzheimers and Alzheimers screening. To delimit the search, the terms outpatient and primary care practice were used within the search databases. Within PubMed, Alzheimers screening cognitive test and further delimiting to in primary care narrowed findings to six results. The CINAHL search was delimited using criteria of 65+ years and outpatient. Narrowing CINAHL produced seven results. Cochrane returned two results with the search Alzheimers. All references used have either a grade A or B in the quality of evidence, and levels were dependent on the type of study according to the Johns Hopkins Nursing Evidence Based Practice (JHNEBP) Rating Scale (Newhouse, Dearholt, Poe, Pugh, & White, 2005).

Inclusion criteria included full-text articles published in the English language. The age of the subjects studied was identified as 65 and older. Due to the rapidly changing research in AD, the majority of studies were identified from the last five years (2012-2017).

**Screening Tools**

The use of many different screening tools for cognitive decline and AD has been evaluated throughout the years (Alzheimer’s Association, 2003; Cordell et al. 2013; Costa et al. 1996; Cullen, O’Neill, Evans, Coen, & Lawler, 2007). The Mini-Mental Status Exam (MMSE) is
a common and well-known tool that is used internationally (Folstein, Folstein, & McHugh, 1975). MoCA is well known and gaining more reputability internationally as it is used in more than 100 countries around the world (Nasreddine, Phillips, & Chertkow, 2012). Saint Louis University Mental Status (SLUMS) is another well-known screening tool that is useful in detecting dementia and MCI (Tariq, Tumosa, Chibnall, Perry, & Morley, 2006). The Mini-Cog is a shorter screening tool that, while not as specific or sensitive, has a shorter timeframe of three to five minutes (Borson, 2015). Included in the Mini-Cog is the Clock-Drawing Test (CDT), which can also be a tool used on its own for cognitive impairment screening (Agrell & Dehlin, 1998). The FAQ is another screening tool that is similar to the Activities of Daily Living (ADL) in that they both assess the abilities of the individual to perform tasks in their own living environment in how dependent or independent they function, whereas some of the cognitive screening tools neglect this area (Pfeffer, Kurosaki, Harrah, Chance, & Filos, 1982).

Many providers in primary care clinics are using the Mini-Cog test since it is a fast and relatively easy screen to administer. Another relatively quick and easy screening tool that has been developed and validated is the Rapid Cognitive Screen (RCS). It is less than three minutes in length and involves recall, clock drawing, and insight. Malmstrom et al. (2015) evaluated this screening tool in sensitivity and specificity in detecting MCI and dementia on the Diagnostic and Statistical Manual IV (DSM-IV) and SLUMS and validity for nursing home placement and mortality. AUC scores showed that the RCS is a better predictor overall of dementia and MCI on the DSM-IV with the largest difference shown in the MCI population. In comparison to the CDT, the CDT has not been involved in studies that can validate if that is a reliable measure of identifying MCI. While SLUMS has been shown to have good sensitivity and specificity for
dementia and MCI, it takes about six to eight minutes to administer, and RCS is a rapid version of this test.

One barrier in dementia screening that may be anticipated is a resistance from the patient population. While screening can be helpful for caregivers, patients may feel scared that they will be labeled or fear repercussions from insurance companies. However, Holsinger, Boustani, Abbot, and Williams (2011) found that more than 81% of primary care patients indicated that they would actually want to be screened to determine if they are developing dementia. They then provided the patients with education regarding the risks and benefits of screening, and the number of patients who wanted to be screened increased to 86%. Rasmussen and Iliffe (2014) argue between the pros and cons of general practitioners conducting screening for dementia, but both agree that dementia and cognitive impairments are a growing international issue. In screening individuals in primary care, where patients come to have a general wellness check and trust that their concerns are being addressed, the practitioners are in a privileged role that can help these individuals early on.

**Dementia Risk Score**

A recent study by Walters et al. (2016) looked at a Dementia Risk Score between patients in the United Kingdom (UK) from PCPs. Using the algorithm developed in this study, the screening tool identified higher risk populations for dementia in PCPs. The data showed that the Dementia Risk Score was able to make a strong relationship with the risk of developing dementia in the next five years using a scoring system. Among the drawbacks of this study is that it is a newer developed screening tool, so the validity needs to be tested more rigorously before it can become a tool that is implemented into practice. Also, the study was performed in the UK, where the population studied may not be generalizable to populations in the United
The Dementia Risk Assessment algorithm that was developed from this study seems to combine many of the mental status questions and activities of daily living questions that are used in other cognitive screening tools. It may be the direction of the future if validation studies continue to implement this risk assessment tool.

**Instruments for Dementia Screening**

The MMSE was developed in 1975 for differentiating between functional and organic disorders in psychiatric patients (Folstein et al., 1975). Today, it is most widely used as a cognitive screening instrument in the United States and many other countries (Cullen et al., 2007; Tombaugh & MacIntyre, 1992). Cordell et al. (2013) reviewed 15 different cognitive assessment tools that have been evaluated in multiple review articles for the purpose of implementation in the primary care setting for annual wellness visits. They found that, due to time constraints, limitations with different screenings, and proprietary issues, the most recommended screenings would be the General Practitioner Assessment of Cognition (GCOG), Mini-Cog, and Memory Impairment Screen (MIS). However, the recommendations according to the Alzheimer’s Association algorithm are that once a cognitive impairment is suspected, a full assessment and evaluation for dementia should occur. While not one tool is recognized as the best assessment tool, the MMSE, SLUMS, or MoCA can be used to further evaluate dementia and its severity.

Stewart, O’Riley, Edelstein, and Gould (2012) compared the MMSE, SLUMS, and MoCA. They found that, while the MMSE continued to have reliability and accuracy in screening for dementia, the SLUMS and MoCA addressed some cognitive skills that are not addressed in the MMSE. Limitations associated with the MMSE include that it is licensed by the Psychological Assessment Resources (PAR) (Holsinger, Deveau, Boustani, & Williams, 2007; Powsner & Powsner, 2005). PAR does not allow the MMSE to be copied from an unlicensed source, but
rather it must either be purchased or administered from memory. This limitation can be a
difficult hurdle with implementing screening processes in primary care, so the SLUMS and
MoCA are also well established and used public screening tools that are available. Because the
MoCA is highly sensitive and reliable, as well as free for clinics to perform, it is a more enticing
package for practitioners and facilities to choose as a screening tool.

Brown, Joliffe, and Fielding (2014) evaluated the MMSE and the Functional
Performance of Inpatients (FIM) to see if there was an association between the two. They found
that the MMSE scores for inpatients were significantly associated with the total FIM scores. The
FIM scores are used for inpatients to determine a patient’s functional capabilities upon discharge.
This scale is similar to the FAQ in that they both examine functional capabilities. The MMSE
scores are shown to be associated both in the FAQ and the FIM scores, and FAQs are more
appropriate in the outpatient setting.

Del Campo et al. (2016) conducted two investigations in France comparing the MMSE
and the Alzheimer’s Disease Assessment Scale-Cognitive Subscale (ADAS-Cog) screening tools
for the PCP setting. ADAS-Cog measures the severity of AD symptoms but is most widely used
in clinical trials and has less responsiveness with MCI. (Skinner et al., 2012). The results of the
ADAS-Cog screening tool showed that there was a great likelihood that it was able to predict
whether a patient with mild to moderate AD was likely to develop cognitive decline over the
next two years. The ADAS-Cog and the MMSE are both tools to measure cognitive impairment;
however, the MMSE is more widely accepted for the use in PCPs. (NIH, 2012). While the
MMSE remains a widely used tool, it also is generally used more for comparisons with previous
MMSE scores and comparisons with other patients while there are newer screening tools for
cognitive impairment that are more sensitive and specific.
The MoCA screening tool is a newer developed tool, validated in 2005 to assess the cognitive functioning or impairment with MCI and AD in a relatively short time frame – about 10 minutes (Nasreddine et al., 2005). Studies have evaluated different screening tools against one another in attempts to find what is most preferred. While no one screening tool is recognized as the gold standard for MCI and AD, the MMSE, MoCA, and SLUMS are among many providers’ preferences. Cummings-Vaughn et. al (2014) examined a comparison between a short test of the Mental Status Exam, SLUMS and MoCA and found they all had similar validity with the detection of MCI or dementia according to the Clinical Data Rating Scale (CDR). In another comparison study, the SLUMS, MMSE, and MoCA were compared in the detection of cognitive impairment (Cao et al., 2014). The findings in this comparison showed that the SLUMS scores are fairly consistent with the MoCA.

**Functional Activities Questionnaire**

The FAQ is an attractive screening instrument because it is easy to administer and aids in the detection of cognitive impairment by being able to differentiate between cognitively normal individuals and those with dementia (Steenland et al., 2008). The MMSE, MoCA, SLUMS, FAQ, the Informant Questionnaire on Cognitive Decline in the Elderly (IQCODE), and the ADAS-Cog are among the most-used AD screening tools (Alzheimer’s Association, 2003; Cordell et al., 2013; Costa et al., 1996; Cullen et al., 2007). More recent studies are investigating the effectiveness of the different tools in the PCP setting since it is identified that early detection of AD can yield improved outcomes.

Another study by Cruz-Orduña et al. (2012) examined the combination of three validated and reputable cognitive evaluation screening tools: the MMSE, IQCODE, and FAQ. Sensitivity, specificity, and area under the curve (AUC) were measured. AUC, using the MMSE and the
FAQ, was 0.95, which was indicative of very strong certainty of reliability. Old methods and the use of one type of screening tool can miss possible cognitive impairments in AD patients who may have otherwise been identified. This study had findings similar to the sensitivities and specificities of many other research studies that evaluated these tools (Shulman et al., 2006). However, it is clear that with a combination of the tools, the outcome is improved. The study found the IQCODE to not be as helpful and determined that the combination of the MMSE and the FAQ was the best to detect AD. While this study was conducted between associations of combining the MMSE and FAQ as having improved sensitivities and specificities, it would seem that similar results could be achieved by combining different types of screenings to assess both cognitive functioning and mechanical functioning.

**Biomarkers and Frequency Doubling Technology**

Currently, much headway is being made in the research of biomarkers. Some studies are proposing that, with biomarkers, AD can be identified before there is clinical indication or symptoms (NIH, 2012; Monge-Argilés et al, 2016; Mortamais et al., 2016). In 2012, the NIH put forth much effort and funding to support Alzheimer’s research and medications for patients who are positive with the APOE4 allele, best known for a risk with late-onset type of Alzheimer’s. This study will test through imaging and biomarker techniques to identify faster ways to evaluate prevention therapies in the future (NIH, 2012). Results in a Spanish population study by Monge-Arguilés et al. (2016) found that APOE4 status is associated with lower CSF Aβ42 as well as higher CSF T-tau and p-tau protein levels and tau/Aβ ratios, in patients in the early stages of AD and in control subjects. However, the presence of APOE4 does not seem to be a deterministic factor for the development of AD, with results being inconclusive (Kester et al., 2009; Popp et al., 2010; Vemuri et al., 2010). Biomarkers that are being investigated include
variants in the CSF, abnormal tracer retention on amyloid positron emission tomography (PET) imaging, decreased flurodeoxyglucose (FDG) uptake on PET imaging, and atrophy seen on magnetic resonance imaging (MRI) (Martínez-Torteya, Treviño, & Tamez-Peña, 2015).

Mortamais et al. (2016) explored the feasibility of detecting signs of dementia in a preclinical phase, or the start of MCI. Biomarkers with correlating memory decline, and Igh levels of amyloid deposition were identified as having positive associations. There are also several bias and other factors that can account for these changes that may not be indicative of AD. The conclusions of this study were not able to determine if the criteria for preclinical AD staging would further improve outcomes or help to understand AD at this time.

Valenti (2013) investigated early functional biomarkers of AD using a technology called Frequency Doubling Technology (FDT). FDT is a type of visual testing that assesses the nerves in the eye and brain. Valenti was able to conclude that there is a strong likelihood that FDT can be useful in ruling out individuals that may need additional workup, including AD testing, if they fail FDT testing. However, biomarkers can also be indicative of other neurodegenerative diseases. The use of biomarkers in the outpatient PCP setting is not realistic because this type of testing can be costly. Insurance providers are not likely to promote these types of testing, and there is fear from patients that this type of testing can alter their abilities to hold driver’s licenses and also may interfere with insurance premiums (Thies & Blellar, 2012). In comparison to cognitive screening tests, the applicability for screening tests within the PCP office is a more feasible and cost-effective approach.

Telephonic Assessment Questionnaires

Royall, Velez, and Salazar (2012) conducted a telephone study with participants to screen for MCI and AD. They used the Alzheimer’s Questionnaire (AQ) with the Telephone Executive
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Assessment (TEXAS), Telephone Interview for Cognitive Status-modified (TICS-m), and Buschke Memory Impairment Scale (telephone version) (MIST) as predictors of MCI and AD. These screenings were not as sensitive to distinguish MCI and AD via telephone. Many patients and caregivers of AD are not able to come into clinics for testing, or it can be a very cumbersome process. This study addressed that gap in practice and aimed to capture more data. In doing so, it sought to validate the need in the community for increased MCI and AD resources and assistance. Using a telephone method is more effective and efficient in screening due to logistics where both the patients and the caretakers do not have to leave home. Sometimes caretaker burden may prevent caretakers from bringing in a patient, even when they know they need more resources. With these telephone assessments, the caretaker is able to provide the information over the phone and may have more insight than the patient into the degree the dementia is affecting the patient.

This study was furthered two years later with the same authors and found that the use of the Alzheimer’s Questionnaire over the phone was able to distinguish to a modest degree between patients with MCI and those without (Salazar, Velez, & Royall, 2014). The addition of the TEXAS allowed more information to be gathered in relation to the severity of the dementia.

The modified telephone interview for cognitive status (TICS-m) is another widely used screening instrument that is used for Alzheimer’s dementia. This telephone interview was modeled after the MMSE due to the difficulties that face-to-face administration of screening tools pose, especially for those with cognitive or physical limitations. However, while this is a screening instrument that works well for those limitations, it is still found to have generalizable data regarding cognition as well as memory functioning (Van der Berg, Ruis, Biessels, Kappelle, & Van Zandvoort, 2012).
There are many different screening tools in place for the PCP setting to help identify MCI and AD as well as newer screening tools to assess for the risk in developing these cognitive impairments. The studies show promising results in each assessment. When comparing and contrasting the applicability of the screening tests, PCP offices will need screening tools that are feasible for use. The use of biomarkers, while an exciting part of ongoing research, is not a cost-effective solution for use in PCPs. FDT is another exciting research initiative, but this also is not a cost-effective screening tool for PCPs. When reviewing the many different available screening tools in use for MCI and AD, practitioners will want a widely used and validated tool such as the MMSE, SLUMS, Mini-Cog, MoCA or GCOG. While the Dementia Risk Score has many promising uses for the future, it has not been validated enough times to be recommended within the national guidelines as of yet. The telephone assessments are another interesting and important way to capture more information. However, they would be most useful in assessing changes in known MCI and AD patients rather than identifying patients. The gold standard of screening tools remains to be with more validated and used screening tools. While each screening tool has some limitations, the MoCA is a validated and widely recognized tool that has shown great results for specificity and sensitivity as well as being free for public use. Using a combination of the MoCA and the FAQ, as both validated tools, results show increased sensitive, specific, and yield greater AUC scores. This also helps in overcoming the limitations that are faced in only using one type of screening tool since each has different strengths and emphasis to get a better overall sense of a person’s risk factors and impairments. This would help to identify and capture more cases of MCI and AD within the PCP and, in turn, help those individuals to receive earlier care and interventions when needed.
Evidence Based Practice: Verification of Chosen Option for Dementia Screening

Based on the review of the literature, a combination of two validated screening tools were used to screen individuals at risk for dementia. The MoCA and FAQ tools in combination are sensitive and reliable for detecting early MCI and AD.

Theoretical Framework/Evidence Based Practice Model

Kurt Lewin’s three-step model for change is a strategy to bring about a desired change in a workplace and help others to see why and how the change is needed (Lewin, 1951; Appendix D). The model is divided into three steps: unfreezing, moving, and refreezing. Unfreezing is first by introducing the desired change to nurses and providers, which would be the use of the screening tools. (Lewin, 1951). In introducing this intervention, it is important to create a sense of safety that this change will bring about better outcomes. Jost (2015) examined the psychological resistance to change and the application of Lewin’s theory as still being a relevant and working model in helping alleviate that resistance and transition into the desired change. Marshak (2012) writes about using the Lewin theory of change in his practice with much success as well as integrating Korean theories and Eastern cultural teachings. When introducing this Quality Improvement project to nurses and providers, the prevalence of Alzheimer’s disease and devastation it causes in the health care sector and with families should be stressed. By using a screening tool to identify at-risk individuals at an earlier time, this can be prevented, and outcomes can be improved. This safety is created when there is recognition that change will bring better outcomes and is necessary for the future care of the growing population. It may also create a sense of guilt for not having used these interventions before, but Alzheimer’s Dementia is an important issue that needs more recognition and will ultimately bring about a better change for the future in how caregivers recognize and treat this disease. The moving stage provides
more information on how this change will come about, such as the logistics of how the screening will happen and what types of tools will be used. This will be achieved by educating the nurses and staff regarding AD and the screening process that will be implemented. Then, there is the shift of actually implementing the change into practice (Manchester et al., 2014). This step will occur when the nurses and staff begin to implement the screening process within their daily workday with patients. Once the process actually begins and the nurses start to have a more tangible relation with screening individuals, they will start to understand how it can improve their practice, improve the workload for providers, and improve patients’ outcomes overall. Refreezing is the last phase, and this involves implementing the new system and any modifications needed. While the nurses are implementing the screening process, they may see changes that are needed or have ideas in modifying the project. There will be focus groups to allow for the exchange of ideas and any changes that need to take place to make the project work well for the site. This will also help to make the project more generalizable and repeatable for future sites to implement.
Goals, Objectives and Expected Outcomes

**Goal 1:** Nurses will be educated to administer MoCA and FAQ screening tools.

<table>
<thead>
<tr>
<th>Objective</th>
<th>Expected Outcome</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nursing meeting with DNP student and nurses.</td>
<td>First meeting will be held by 10/30/17.</td>
<td>Met: Meeting held and successful.</td>
</tr>
<tr>
<td>Sample MoCA and FAQ screening tools reviewed with nursing.</td>
<td>MoCA and FAQ screening tools have several samples and opportunities for nursing to practice.</td>
<td>Met: Screening tools reviewed with nursing and opportunities for questions and practice given.</td>
</tr>
<tr>
<td>MoCA and FAQ tools have locked area in nursing station for nursing to store when completed.</td>
<td>Secured area in nursing station designated by 11/6/17.</td>
<td>Met: Secured area with key lock in cabinet within the Elder Care department. Nurses kept the key in the Complex Care RN office.</td>
</tr>
</tbody>
</table>

**Goal 2:** Nursing and the DNP student will meet in focus groups to address any issues or concerns.

<table>
<thead>
<tr>
<th>Objective</th>
<th>Expected Outcome</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nursing meeting with DNP student and nurses.</td>
<td>First meeting will be held by 10/15/17.</td>
<td>Met: Meeting successful.</td>
</tr>
<tr>
<td>Monthly meetings between nursing staff, DNP student, and nurse practitioners.</td>
<td>30% of staffing will attend meetings to address any concerns or issues with the screening process.</td>
<td>Met: Focus meetings met monthly with 90% of essential staff.</td>
</tr>
<tr>
<td>DNP student and Providers oversee the screening process.</td>
<td>Nursing staff will alert the health care provider (i.e., Nurse Practitioner, Physician Assistant or Physician) when there are positive screenings.</td>
<td>Met: Providers notified of positive screening.</td>
</tr>
</tbody>
</table>
**Goal 3:** Health care providers will benefit from the use of these screening tools in early identification of Alzheimer’s Dementia patients.

<table>
<thead>
<tr>
<th>Objective</th>
<th>Expected Outcome</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health care providers will enhance the identification of Alzheimer’s Dementia patients through the screening tools.</td>
<td>Nursing will administer the screening tools 90% of the time to persons in population of interest.</td>
<td>Met: 100% of population of interest was administered screening tools.</td>
</tr>
<tr>
<td>Health care providers will enhance the identification of Alzheimer’s Dementia patients through the screening tools.</td>
<td>25% of health care providers will report that using the screening tools is useful in the clinical setting.</td>
<td>Met: 86% of providers agreed the screening tools are useful (6/7 providers).</td>
</tr>
</tbody>
</table>

**Goal Related to Effectiveness**

**Goal 4:** Health care providers will find the combination of the MoCA and FAQ to be more effective of a screening tool than the Mini-Cog

<table>
<thead>
<tr>
<th>Objective</th>
<th>Expected Outcome</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>The combination of the MoCA and FAQ are more effective than the Mini-Cog.</td>
<td>Increased Specificity levels measured.</td>
<td>Met: Increased Specificity levels were seen with the MoCA and FAQ screenings.</td>
</tr>
<tr>
<td></td>
<td>Increased Sensitivity levels.</td>
<td>Met: Increased Sensitivity levels were seen with the MoCA and FAQ screenings.</td>
</tr>
</tbody>
</table>
**Goal Related to Population**

**Goal 5:** Persons 65 and older will have positive experiences with the screening tools and process.

<table>
<thead>
<tr>
<th>Objective</th>
<th>Expected Outcome</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Persons of age 65 and older will have opportunity to consent to or refuse screening.</td>
<td>95% of individuals of interest will consent to screening.</td>
<td>Met: 100% of individuals of interest consented to screening.</td>
</tr>
<tr>
<td>Persons of age 65 and older will have an opportunity to discuss results of screening with a health care provider.</td>
<td>95% of participants will receive counseling and education regarding the results.</td>
<td>Met: 100% of participants were offered counseling and education regarding results.</td>
</tr>
</tbody>
</table>

**Project Design**

This DNP project has a Quality Improvement (QI) project framework and an educational evaluation design that was set up to address the gap in practice through screening individuals and implementing education-based findings. The nurses were educated by the DNP student in administering the MoCA and FAQ screening tools with patients who were within the criteria. The criterion, as stated earlier, is persons of age 65 and older who consent or another designated person that has Power of Attorney (POA) to consent for screening.

To obtain the desired outcome, there was education for the nurses and ongoing focus groups with nurses and practitioners to review feedback during the project course. Using the feedback in focus groups, the project was modified to the site as needed.

**Project Site and Population**

The project took place at an Internal Medicine primary care clinic in Duluth, MN. In the Internal Medicine Clinic, the nurses who administer annual wellness exams included this in their review with the patients. Before, there was a Mini-Cog screening tool that the nurses
administered. In the interest of time management, the MoCA and FAQ were not given unless the person performed poorly on the Mini-Cog, indicating possible cognitive impairment.

The Internal Medicine Clinic in Duluth, MN is a large primary care clinic with around 19,000 patients from both Minnesota and Wisconsin. This clinic provides for a large spectrum of the community. Many people are willing to travel to Duluth for services because it is owned by Essentia Health and is a Level II trauma center. The closest Level I trauma center is in Minneapolis, MN, which can be much further for people.

Participants were selected at each site with the criteria of being age 65 or above and have given consent (or consent of the POA). Those with known AD who are currently receiving treatment were excluded, as well as psychiatric or cognitive issues that are diagnosed that could impair or skew results. Examples of psychiatric exclusions included severe depression, schizophrenia, Post-Traumatic Stress Disorder, and any anxiety disorder that the patient is not able or willing to participate. Examples of cognitive conditions that were excluded were Traumatic Brain Injuries, Down Syndrome, Autism, and developmental disorders that prevented the patient from participating, and any type of neurocognitive disorder that prevented the patient from participating. The sample size was 14 participants with the inclusion and exclusion variables as well as screening only the adults that accepted doing the annual wellness visit and further screening.

The Internal Medicine Clinic is organized according to physicians. Each physician and Advanced Practitioner (AP) is organized into care teams. Each care team has two to three nurses who help to direct patient calls and results to patients in an organized and timely fashion. There are several Warfarin nurses that strictly work by protocols with patients who are on Warfarin and need their dosages adjusted according to their International Normalized Ratio (INR). There are
also two separate complex care Registered Nurses (RN) who conduct annual wellness visits, walk-in visits, and any additional ancillary needs (suture removals, wound care, Mantoux reads, etc.). The clinic is open from 8:00 a.m. until 5:30 p.m. and different practitioners have schedules that are worked out among one another. When one physician is away, another from the same care team will cover any patient needs. Nurses are scheduled from 8:00 a.m. to 4:30 p.m. and 9:00 a.m. to 5:30 p.m. and and always have coverage among care team members. In order to implement the project, the DNP student conducted teaching with the complex care RNs who give the annual wellness visits and care team/triage nurses in the instance that complex care RNs are unable to perform the tasks.

Setting facilitators and barriers.

Conducting the MoCA and FAQ screening tools required education with the providers on the patient population in the area and the amount of aging population that will be falling into the age group for being at increased risk for dementia. With early diagnosis and intervention, it can allow people to make decisions much earlier while they still have that cognitive ability to make those decisions. (Alzheimer’s Disease International, 2011). However, one barrier has been that practitioners and other staff members are resistant to change. Many providers prefer to focus on current health issues rather than preventative care.

With the MoCA and FAQ screening tools, the registered nurses were the ones that performed the screenings with the patients. In educating the registered nurses to administer the screenings, the hope was to help with time management for the providers and data collection. Another benefit of the RN in the annual wellness exams is that Medicare pays for those visits, so they were more likely to interest patients since they have no cost associated with the visit if they are only seeing the nurse.
One early barrier that was encountered was attempting to set up an affiliation between the facility and the university. The university has an Internal Review Board (IRB) that reviews the project proposal in relation to ethics with human research. Once this was approved, the facility also had a separate IRB process to approve the project. In addition, a separate status of being a student was needed to establish for the DNP student in order to gain access to the Electronic Health Records (EHR). This required separate documentation of another background check, immunizations, health records, malpractice insurance, and information regarding student identification and research qualifications. This process took much longer than anticipated and delayed the start of the project by four months. Due to the delay, the project was not able to gather as much data, but some data was able to be collected retrospectively to enhance the quality of data and data numbers.

At first some nurses did give some resistance, as this was a deviation from their normal schedule. After a few patients and due to the infrequency of when this occurred, they did start to become more comfortable. However, the time that it took to administer both the MoCA and the FAQ screening tools, especially when the patient was scheduled to see their primary care physician after the nurse wellness visit, was an ongoing barrier that was seen. This, in turn, created some compliance issues among nurses and patients with using the screening tools on the population of interest.

With the positive screenings and this QI project, they were able to make a referral to either neurology or the outpatient memory clinic and/or initiate medication management in a more timely fashion. However, there were some barriers encountered with this process as well. Some patients preferred talking to their primary care or waiting to have any referrals placed. Also, there were times when primary care providers preferred to do further assessments on their
patients and conduct more history and decided that a MoCA assessment or further referral was not warranted. Each screening was individual to the patient and there were many other factors to take in consideration before narrowing down to cognitive impairment.

There was anticipation that the practitioners may not want to focus on preventative care. However, with Medicare covering the annual wellness exam, this did interest more patients to come in, and many providers found this useful in getting overall patient wellness information and further screening needs. Also, from a business standpoint, the annual wellness exams help to bring in great revenue for the clinic with reimbursement from Medicare.

Another aspect to be addressed is that nurses and/or providers did need to obtain a thorough health history, including any known dementia in the patient’s relatives. The health history was conducted prior to annual wellness visits as part of the patient’s complete physical, so this was not a change to practice but rather an additional consideration with patients that were appropriate for screening. A component of the annual wellness exam is a review of family medical history. Many times, patients forget to mention dementia as a medical issue, but the nurses were prompted to ask if anyone in their family had dementia and many times this concern was brought up if the patient had concerns over their own memory, before assessment began.

**Implementation Procedures**

1. Nursing meeting to introduce project. Includes nurses, nurse practitioners, DNP student, and physicians who wished to attend. Explained the gap in practice with Alzheimer’s and the solution in using screening tools and presented with a PowerPoint presentation.
   a) Introduce screening tools to be used.
   b) Population of interest that will be screened.
   c) Obtain patient consent to be screened.
d) Role-play with screening tools and examples.

e) Show staff where completed documentation in the nursing station is kept.

2. Focus groups met prior to project, monthly, and after completion of project with nursing staff and providers.

   a) Emails sent to alert nurses of the focus group prior to date.

   b) Dialogue between DNP student and staff to facilitate improvement and continuation of the project.

3. Data Collection

   a) DNP student provided packets within the Annual Wellness Visit packets for the nurses to use if the patient failed the Mini-Cog. These packets included Drake QI Project- Data Intake (Appendix E), as well as MoCA and FAQ screening tools.

   b) Completed packets were placed by nursing staff into the locked nursing station cabinet, located within the Elder Care department.

   c) DNP student collected packets that were kept in the locked area within the nursing station.

4. Data Analysis

   a) Staff members issued optional surveys with the Drake Likert Scale (Appendix F) to determine the effectiveness and value of the screening tools used. Included an area to write in comments or ideas for further improvement.

   b) Data from the screening tools compiled to determine the quantity of positive screenings and whether or not interventions took place.

   c) Sensitivities and specificities calculated from the data
d) Overall number of failed Mini-Cogs calculated to give percentage of population that would require the further screening tools, MoCA/FAQ.

e) Time and Cost analysis calculated for the Mini-Cog and MoCA/FAQ and compared.

**Measurement Instruments**

In order to measure the outcomes of this DNP project, the following instruments will be used: Mini-Cog (Appendix C), MoCA (Appendix A), FAQ (Appendix B), and Drake Likert Scale (F).

**Mini-Cog**

The Mini-Cog is often implemented in the primary care office setting as it is a relatively easy screening to administer and it takes about three to five minutes to complete. While it can identify some mild cognitive impairment, there is not enough data to support it in detecting MCI. Sensitivities, based on the studies, range from 60% to 99% (Cullen et al., 2007; Carnero-Pardo, Cruz-Orduña, Espejo-Martínez, Martos-Aparicio, et al, 2013).

**Montreal Cognitive Assessment**

The MoCA study has been validated for international use. Nasreddine et al. (2005) performed studies to evaluate the sensitivity and specificity of the screening tool. It was found that the MoCA detected 90% of patients with MCI whereas the MMSE was compared and had a sensitivity of 18%. With mild AD, the MoCA detected 100% and the MMSE had a sensitivity of 78%. Specificity was excellent for both the MMSE and MoCA, being 100% and 87%, respectively. The questionnaire is easy to follow and administer. It is limited in its ability to assess functional and mechanical independence or dependence.

**Functional Activities Questionnaire.** The FAQ is a functional assessment questionnaire that assesses what an individual is able to do at home and how much help they do or do not need
in order to do those functional activities throughout the day. It is a 30-item questionnaire that is completed by an informant. It can acquire valuable information as it is obtained from a reliable source that knows the participant well. The questionnaire is easy to follow and self-explanatory. This screening tool is considered to be reliable and measures functional rather than cognitive abilities, which is something that can be limited with other screening tools. It is limited in that it mainly focuses on functional abilities but is able to discern with a good validity the degree of a person’s independence or dependence. (Steenland et al., 2008). The FAQ was previously identified by the Agency for Health Care Policy and Research as having sensitivities and specificities in the 85-90% range in relation to identifying individuals with dementia (Costa et al., 1996).

**Drake Likert Scale.** This is a five-point Likert scale created by the DNP student to evaluate feedback from the nursing staff. Each question has a range of answers to determine the effectiveness and value for this project. The answers are as follows in order: Very Poor, Poor, Fair, Good, and Very Good. Very Poor receives zero points, and they each increase sequentially by one point with Very Good receiving four points. The last question allows opportunity for suggestions to improve the project for future endeavors. The person taking the survey remains anonymous and rates each question according to how they feel the screening tools measured in their own opinions.

**Data Collection Procedures**

**Pre-Intervention.** Recruitment took place by hosting a nursing meeting with the project mentor for nursing staff, nurse practitioners, nursing administration, and any physicians who wished to attend. A project Power Point presentation with handouts and samples of the screening tools gave nurses visuals and hands-on training. Incentives included adding data support and
collection for doctoral quality improvement project to job resumes for those who participated in the project. The meeting took place one week before the date of the project beginning so that nursing staff members were able to ask questions and voice any concerns regarding the process. At this meeting, the process of where to store the completed screening tools in the nursing station was shown, and the importance of keeping data locked for patient privacy was stressed.

**Intervention.** Upon initiation of the project, nursing staff continued throughout their normal day. Per policy, the Mini-Cog is administered as part of the annual wellness visit. The nurses who were conducting the annual wellness visits determined if the MoCA and FAQ screening tools were appropriate. This was based on age, mental capacity, if there was anyone available with the patient to assist with the screening of the FAQ, and if they pass or fail the Mini-Cog. The Drake QI Project- Data intake form (Appendix E), MoCA, and FAQ screening tools were provided to the RNs in the packet of information in the annual wellness folders to use, if needed. If it was determined to continue on with the MoCA and FAQ screening tools, then those were conducted and the completed screening tools were placed in the locked area where instructed. The DNP student came to the clinic weekly to assist with screenings, any needed assistance, answering questions with staff, and compiling data that had been collected.

Providers were notified of results so that if any interventions were necessary according to the judgment of the provider, they were able to initiate such. In the case of screening tools being unable to be completed, they were marked as such and were excluded from data review. The patients were assigned patient numbers according to the clinic Medical Record Number (MRN) for identifying patient factors on the screening tools.

Focus groups consisted of nursing staff, nursing administration, and providers who wished to attend and met during the project timeframe to make any necessary changes,
improvements, and to corroborate with the nursing staff to evaluate the project efficiency and value.

**Post-Intervention.** The Drake Likert Scale was given to the nursing staff and providers who participated in the project, and the data collection was reviewed and analyzed. One last focus group/meeting after the project was completed was held to vocalize any ideas, suggestions, or further support from nursing staff, administration, and/or providers.

Data was analyzed for the effectiveness of the MoCA and FAQ screenings. It included result of Mini-Cog, patient education level, person conducting the evaluation, whether or not other persons were present during the screenings, provider involved in care, if any intervention was needed and time taken to complete the screenings. The data collection sheet was called the Drake QI Project- Data Intake (Appendix E). Data included evaluating the difference between failed Mini-Cog screenings and failed MoCA and FAQ screenings to get a percentage. Data also examined failed Mini-Cog screenings and normal MoCA and FAQ screenings as a percentage to look at the false positives with the Mini-Cog. In doing this, the specificity and sensitivity was calculated to examine if the Mini-Cog was effective or if the MoCA and FAQ was a more effective use of time and resources in the annual wellness visits.

**Data Analysis**

**Mini-Cog**

The Mini-Cog is a short assessment that takes about three to five minutes to complete. The screening involves memory recall of three words about three to five minutes after they are initially given to the participant and a clock-drawing test. The clock-drawing test involves the surveyor giving the participant a time and asking the participant to draw a clock at that time with correctly filling in all the numbers to the clock. One point is given for each correctly
remembered word for a total of three points in the recall section. The clock is evaluated with a zero or two, with zero being a refusal or inability to draw the clock and a two being a normal clock with the correct time indicated. This gives a possible score of five. Cut-off points are indicated that a score less than three is validated for dementia screenings. (Borson, 2015). Therefore, if the patient scored less than a three, they were considered to have failed the Mini-Cog. A score of three or above is a passed Mini-Cog. The data was entered in as pass or fail.

**Montreal Cognitive Assessment.**

The MoCA (Appendix A) is a brief cognitive assessment that evaluates different aspects of cognitive impairment that are seen in MCI and AD. The first section is the visual/spatial section, where the patient is asked to complete a trail map starting at “1” and drawing a line to “A.” From there, the line is drawn to “2” and then to “B,” and so on. In the next exercise, the patient is asked to copy the three-dimensional cube. The clock draw is the next section. The patient draws a clock and is asked to put the time at ten past eleven. The following section is the naming section where the patient names the animals that are drawn. Memory is the next part of the assessment, and the patient must repeat the list of words in two separate trials and then a recall, five minutes later. Attention is the next section and the patient repeats the list of numbers that are given from the person administering the assessment and must list them in the order that they were given. Then the patient is given another list of numbers and must list them back in the opposite order they were given. Language is the next piece of the assessment where the patient repeats the sentences that are said by the interviewer. Delayed recall follows this, and the words that were given earlier in the memory section should be given in any order with three tries, including some cues on the second and third try. Orientation is the last section. It asks the patient to provide the date, month, year, day, place, and city. The points are indicated on the
exam and totaled to a possible 30 points. A normal score is 26 or above. Data was analyzed on whether the patient passed with a 26 or above or failed with a score below 26. Data was entered in as either pass (26 and above) or fail (below 26).

**Functional Activities Questionnaire.** The FAQ scores were measured as standardized with the point system that is given. Interpretation of scores (Appendix B) includes a range from zero to 30. Zero is scored as “normal” and ranges to three, being “dependent.” A score above nine (where a person is dependent in three or more areas) is considered to be a score that is recommended to have more investigation. (Pfeffer et al., 1982). The data was collected quantitatively as those who scored zero to nine (pass) and those who scored nine and above (fail). Qualitative data included if any interventions resulted from the screening and what that intervention was.

**Drake Likert Scale.** Data collection with the Likert scale consisted of scoring the surveys with each question separately and quantitatively reviewing those scores (Appendix F) and displaying with statistical graphs. The comment sections were reviewed individually and grouped together if there were trends or similar suggestions/ideas/feedback.

**Results**

The results of the failed Mini-Cogs and the failed Moca/FAQ’s were compared with the data collected and evaluated against the need for a referral. This data was found by counting the number of patients and dividing that by the overall patients (who failed the Mini-Cog) and getting the percentage. The number of patients who failed the Mini-Cog and passed the MoCA was five out of 12 patients, or 41.6%. The number of patients who failed the Mini-Cog and MoCA/FAQ was seven out of 12 patients, or 58.3%. The data also included patients who failed both and received referrals and/or further testing, such as lab work. This was six out of seven
patients, 86%. The providers were notified when there were failed screenings and, upon further assessment, a referral was not warranted.

Table 1
*False Positives and Referrals/Further Testing Warranted Comparisons Between Mini-Cog and MoCA/FAQ*

<table>
<thead>
<tr>
<th>Failed Mini-Cog, Passed MoCA/FAQ</th>
<th>Failed Both Mini-Cog and MoCA/FAQ</th>
<th>Patients Who Failed Both, Who Received Referrals</th>
</tr>
</thead>
<tbody>
<tr>
<td>41.6%</td>
<td>58.3%</td>
<td>86%</td>
</tr>
</tbody>
</table>

The time it took to complete each screening assessment was recorded by the RN and the average time to complete the assessments was calculated. The average time of the Mini-Cog was calculated by adding up all the recorded times and dividing by the number of assessments completed. The same was done for the MoCA and FAQ assessment times, and the average time was used as comparison. The time and cost were evaluated by establishing an average RN salary in this particular clinic being $30 per hour, which equals 30 cents per minute. This was compared between the Mini-Cog and MoCA. Using this information, the average time was evaluated for the assessments of the MoCA and FAQ as minutes taken to complete the assessment multiplied by the cost of the RN in minutes. Five minutes multiplied by 30 cents per minute is $2.50; 32.92 minutes multiplied by 30 cents per minute is $16.45.
Table 2

*Time and Cost Analysis and Comparison Between the Mini-Cog and MoCA/FAQ*

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Mini-Cog</th>
<th>MoCA + FAQ</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Time</td>
<td>5 minutes</td>
<td>32.92 minutes</td>
</tr>
<tr>
<td>Average Cost of RN to Complete</td>
<td>$2.50</td>
<td>$16.45</td>
</tr>
</tbody>
</table>

However, this is a two-tiered process where the MoCA and FAQ are only administered if the patient fails the Mini-Cog, or at the discretion of the provider or requests from the patients. The total number of annual wellness visits that were completed during the timeframe was 230, and 12 of those failed the Mini-Cog. This means that 5.22% of the annual wellness visits had patients who failed the Mini-Cog and required the further testing in this QI Project.

Sensitivity and specificity were also measured and compared between the Mini-Cog and MoCA. National studies with the Mini-Cog and MoCA sensitivities and specificities were also compared. (Nasreddine, Phillips, & Chertkow, 2012; Nasreddine et al., 2005; Cullen et al., 2007; Carnero-Pardo et al., 2013). Not enough data was present to include the FAQ in these comparisons.

Sensitivity is a measure of how many patients actually have an impairment and received a referral. With the Mini-Cog, six out of 12 patients failed the Mini-Cog and needed a referral, which gives a sensitivity of 50%. With the MoCA, six out of seven patients failed the MoCA and needed a referral, which gives a sensitivity of 85.7%. Specificity is a measure of identifying those without the disease, correctly. With the Mini-Cog, nine out of 14 Mini-Cog assessments were correct with a referral need, which is 64.3%. The MoCA had 13/14 correct assessments with a referral need, giving a specificity of 92.9%.
Table 3
*Sensitivity and Specificity of the Mini-Cog and MoCA in the Quality Improvement Project*

<table>
<thead>
<tr>
<th>Measurement</th>
<th>QI project: Mini-Cog</th>
<th>QI project: MoCA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensitivity</td>
<td>50%</td>
<td>85.7%</td>
</tr>
<tr>
<td>Specificity</td>
<td>64.3%</td>
<td>92.9%</td>
</tr>
</tbody>
</table>

Table 4
*Generalized Sensitivity and Specificity of the Mini-Cog and MoCA*

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Generalized Studies: Mini-Cog</th>
<th>Generalized Studies: MoCA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensitivity</td>
<td>60%</td>
<td>100%</td>
</tr>
<tr>
<td>Specificity</td>
<td>90%</td>
<td>87-90%</td>
</tr>
</tbody>
</table>

The Drake Likert Scale results were compiled among the nurses that conducted the annual wellness visits and the memory screening assessments as described in the QI project. They rated each question according to their opinion, and results remained anonymous. Each answer was tallied and placed in the column. There were three nurses who completed the Drake Likert Survey and the lowest-scored answer was “Fair.”

Table 5
*Tallied Scores of the Drake Likert Scale*

<table>
<thead>
<tr>
<th>Question</th>
<th>Very Poor</th>
<th>Poor</th>
<th>Fair</th>
<th>Good</th>
<th>Very Good</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td>2</td>
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<td>5</td>
<td></td>
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<td>1</td>
<td>2</td>
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Interpretation

In looking at the results of Table 1, there was 41.6% of the patients who took the Mini-Cog and failed but then went on to take the MoCA and FAQ and passed. With the current process, the patients who fail the Mini-Cog are automatically sent for referrals, unless the provider does an assessment that defers this. Most times, the providers are using the Mini-Cog as the screening tool to determine if the patient should be referred for specialized treatment, lab work, and/or imaging. This data capture the Mini-Cog presenting some false positives and triggering a referral process for patients that are scoring normally in the MoCA/FAQ assessments. Often times with referrals, this can be a costly process for patients and time consuming as well. The Memory Clinic and Neurology are already being bogged down by many referrals, and with this data, this is suggesting that some of these patients are not needing these referrals. Other patients can use those office visits and the clinics can run more slowly with a two-tier process such as this project presented. When furthering the process and conducting the MoCA and FAQ assessments, the sensitivities and specificities were much greater (Tables 3 and 4) in getting proper and timely referrals to those patients. The data provided in Table 1 – 86% of the patients failed both the Mini-Cog and the MoCA/FAQ – is meant to show that both tests together were not completely sensitive and specific. Some providers conducted further assessment and history-taking and determined that some patients did not require a referral and believed the cognitive impairment to be related to other conditions.

The sensitivities and specificities were analyzed and compared to national study results of the assessments, Mini-Cog and MoCA. (Tables 3 and 4). While the project found the Mini-Cog to have a much less specificity than the national published studies, it is evident that the MoCA is superior in both the sensitivity and specificities with the project and with nationally recognized
and published studies. Limitations to the project data include a smaller sample size of 14 patients and limited timeframe between December 2017 and March 2018. With a larger sample size, one would expect the data to more closely resemble the generalized studies’ findings. With the data continuing to support the MoCA and FAQ showing an improved sensitivity and specificity, this also correlates with the idea of getting referrals in a more timely and efficient manner and eliminating referrals that are not necessary. This helps to more correctly identify those who actually have cognitive concern for Alzheimer’s or MCI and get them the referral and in a more time-efficient manner since others who don’t need the referrals are not given those office spots. As this disease can be time-sensitive and starting medications for patients in the early stages of Alzheimer’s has shown some improvements in quality of life and allowing patients to be independent for longer periods of time than without the medications, time-efficiency can be especially important in these cases. (Kumar, Singh, & Ekavali, 2015). Early diagnosis and recognition also allows these patients and their family members to plan for the future. One of the goals of this project was to identify a way to allow more timely identification for the patients if there is cognitive decline and concern. With evaluating the MoCA, this outcome was met and shown to have a better sensitivity and specificity than using the Mini-Cog alone.

Evaluating the time and cost of the further assessments is also important from business, nursing, and patient perspectives. Time and resources are especially crucial in health care, and it is essential to evaluate this data with the project as well. In Table 2, one can see that the Mini-Cog takes much less time on average than the average time it took to complete the MoCA and FAQ assessments together. In evaluating the cost of having an RN conduct these assessments, it is also evident that the cost is much greater to have the RN use more time in the assessment,
ultimately costing the business more money. However, there were a total of 230 annual wellness visits that were conducted throughout this timeframe. That means there was a small percentage of 5.22% that failed the Mini-Cog that qualified to continue on with the further assessment including the MoCA and FAQ. Otherwise, if the patient passed, the further assessment was not needed. Evaluating this information with the increased sensitivities and specificities of the MoCA and FAQ, it seems reasonable to proceed with implementing this two-tiered process that the project investigated.

Another important evaluation that was used in the data analysis was the Drake Likert Scale (Appendix F) to assess how the nurses who conducted the memory screening assessments felt about the effectiveness and usefulness of the project. (Table 5). All the questions that the nurses responded to were of positive results with a response of “Fair” or greater. In looking at the responses, all the nurses chose a lower response for the question on the time-efficiency of the MoCA and FAQ combined. These nurses conduct several annual wellness visits on a daily basis and oftentimes patients are scheduled to see a provider for their annual physical after this nurse appointment. Other times, these nurses have back-to-back visits scheduled for every hour, with these appointments taking an hour or more. Time-efficiency and time management is crucial to keeping the nurses, providers, and patients on time for other appointments and is good business sense as well. That is another reason why it would be important to note that the further MoCA/FAQ assessments are not warranted unless the patient fails the Mini-Cog.

Discussion

The first goal of the QI project was to educate the nurses on the administration of the MoCA and FAQ screenings. This goal was successful throughout each objective. The first meeting was held on time and was successful with a PowerPoint presentation and handouts.
There were samples of the actual assessments and information that was requested to be collected, and the nurses were informed that these would be placed within the annual wellness visit folders for use if and when needed. The screening tools provided a visual for the nurses to use and opportunities for questions as well as hands-on training to see how the MoCA is administered. The locked area in which the completed data was kept – in the complex care RN office – and the key to access the area were shown to participating nurses. The area was designated within the timeframe.

The next goal of the QI project was to hold a nursing meeting with the nurses and conduct focus groups throughout to address any questions, concerns, or ongoing problems. The first meeting was held before the initiation of the project, and the meetings were held monthly thereafter. 90% of staff members who had direct care with the QI project attended the focus meetings, which exceeded the QI objective. Another objective stated that providers were to be notified if there were positive screenings (failed Mini-Cog and MoCA) so that there was an opportunity to do further assessment. 100% of providers received notification of positive screenings.

Goal three of the QI project identifies goals of health care providers and their opinions on whether the use of the screening tools used benefitted their practice. This goal was successful in each objective as 100% of the population of interest was administered the screening tools and 86% of providers agreed that the screening tools were useful.

The fourth goal of the QI project was related to effectiveness. This goal evaluated whether the combination of the MoCA and FAQ were more effective screening tools (when combined) than the Mini-Cog. The result was both increased specificities and sensitivities with the MoCA and FAQ screenings, making this outcome successful.
The last goal of the QI project related to population. The goal was for the persons 65 and older to have positive experiences with the screening tools and process. This goal was successful with the objectives, meeting 100% of individuals of interest consenting to screening and 100% of participants offered counseling and education regarding their results.

After evaluating and finding all project goals to be successful, it is suggested to implement a two-tiered memory screening process into the Internal Medicine Clinic. It would likely benefit any clinic that sees a population of persons aged 65 and older, but with the data that was found within this Quality Improvement project, it clearly benefits the clinic and the patients. Patients were able to have a screening process that was more accurate and allowed for further testing/evaluation and/or referrals to be placed more efficiently and effectively.

**Cost-Benefit Analysis/Budget**

Budgets are necessary for projects to take place and help to further the dissemination of ideas and progress (Berwick & Hackbarth, 2012). By projecting the amount of money in United States dollars and time costs in advance of the project initiation, the DNP student was able to assess the probability of implementing the project. The development of a budget aided the DNP student to remain financially responsible as well as highlighting the benefits that were achieved through the project. The DNP student contributed all the funds necessary to implement the project throughout all stages. The financial budget for the project can be viewed in Appendix G. The expenses that are totaled throughout the financial budget are expenses that the DNP student is responsible for.

**Timeline**

See Appendix H.
Ethical Considerations/Protection of Human Subjects

With any project that uses the participation of humans as subjects, ethical considerations and rights must be addressed. All participants were protected by the Health Insurance Portability and Accountability Act of 1996 (HIPAA), which protects the privacy of patients’ health information (Modifications to the HIPAA Privacy, Security, Enforcement, and Breach Notification Rules, 2013). The DNP student and personnel who carried out this project followed HIPAA regulations and Standards of Care both in the hospital site and at the clinic site. Patient identifiers were purposely excluded to protect patient privacy in the collection of data. The risks to patients participating in the project were not different from the risks of patients receiving care in the facility who were not participants. Participant confidentiality was assured by coding the participants using individualized identification numbers. The list of participants and their identifying numbers was kept locked at the nursing station and only accessible to the DNP student and registered nurses assisting with the project. All electronic files containing any identifiable information were password-protected within the EHR to ensure privacy. EHR are monitored and maintained within the facility and were kept protected under these statutes.

Conclusion

Alzheimer’s Disease is a growing problem in the population that requires increased attention to prevention and early detection. Most everyone knows someone who has been affected or is currently being affected by Alzheimer’s, whether it’s a personal family member, friend, or acquaintance. Not only is it affecting our aging population, but it is also costing our country millions of dollars and will continue increasing. What can we do? We don’t know enough about Alzheimer’s Disease! These are excuses, and here is a proposition to consider in
helping to close that gap, even if it is just a start: In order to discover, we must look. Earlier identification of the disease can vastly improve the quality of life and the overall outcomes, and in some cases can even slow or stop the progression. The use of validated screening tools such as the MoCA and FAQ together can help to identify individuals who are at risk at an earlier stage before symptoms have even begun. Offering this to individuals and families may help to improve the disease prognosis and offer better quality of life. Implications for the future include earlier identification and treatment modalities of impairment. With more interest and education being invested in this population, treatments will continue to be researched, facilities will be dedicated to assist with the special needs of these patients, and public knowledge will improve.
References


Appendix

Appendix A

Montreal Cognitive Assessment (MoCA)

MONTREAL COGNITIVE ASSESSMENT (MOCA)
Version 7.1 Original Version

NAME:  
Education:  
Sex:  
Date of birth:  
DATE:  

POINTS

VISUOSPITAL: EXECUTIVE

Copy cube  
Draw CLOCK (Ten past eleven)  

1st trial  
2nd trial  

__/5

NAMING

__/3

MEMORY
Read list of words, subject must repeat them. Do 2 trials, even if 1st trial is successful. Do a recall after 5 minutes.

FACE VELVET CHURCH DAISY RED

No points

1st trial  
2nd trial  

ATTENTION
Read list of digits (1 digit/sec). Subject has to repeat them in the forward order  
Subject has to repeat them in the backward order

__/2

Read list of letters: The subject must tap with his hand at each letter A. No points if 2 errors

__/1

Serial 7 subtraction starting at 108

__/3

LANGUAGE
Repeat: Icthy knows that John is the one to help today. [ ]
The cat always hid under the couch when dogs were in the room. [ ]

__/2

Fluency / Name maximum number of words in one minute that begin with the letter P [ ] [ ] __/1

ABSTRACTION
Similarity between e.g. banana - orange - fruit  
train - bicycle  
watch - ruler

__/2

DELEYED RECALL
Number recall words  
FACE VELVET CHURCH DAISY RED

__/5

Optional

Category cue

Multiple choice

ORIENTATION

Date  
Month  
Year  
Day  
Place  
City  

__/6

© Z. Nasreddine MD  
www.mocatest.org  
Normal 26/30  
TOTAL  

Scored 1 point if ≤ 12 years old.
Appendix B

Functional Activities Questionnaire (FAQ)

Initial Dementia Assessment
Attachment 3—Functional Activities Questionnaire (FAQ)

The FAQ is an informant-based measure of functional abilities. Informants provide performance ratings of the target person on ten complex higher-order activities.

Individual Items of the FAQ
1. ___Writing checks, paying bills, balancing checkbook
2. ___Assembling tax records, business affairs, or papers
3. ___Shopping alone for clothes, household necessities, or groceries
4. ___Playing a game of skill, working on a hobby
5. ___Heating water, making a cup of coffee, turning off stove
6. ___Preparing a balanced meal
7. ___Keeping track of current events
8. ___Paying attention to, understanding, discussing a TV show, book, magazine
9. ___Remembering appointments, family occasions, holidays, medications
10. ___Traveling out of neighborhood, driving, arranging to take buses

Total ______

The levels of performance assigned range from dependence to independence and are rated as follows.

- Dependent = 3
- Requires assistance = 2
- Has difficulty, but does by self = 1
- Normal = 0

Two other response options can also be scored.

- Never did (the activity), but could do now = 0
- Never did, and would have difficulty now = 1

A total score for the FAQ is computed by simply summing the scores across the 10 items. Scores range from 0 to 30. A cutpoint of 9 (dependent in 3 or more activities) is recommended.

Source:

Revised April 1999
Appendix C

Mini-Cog Test

Appendix D

Kurt Lewin’s Three-Step Model for Change

Source: Google image 1 Kurt Lewin’s et al. (1939)
Appendix E

Drake Quality Improvement Project - Data Intake

Date ________________________________

MRN # ________________________________

DOB ________________________________

Level of Education of Subject
______________________________

Person Performing Screening
______________________________

Other Persons Present (relation to subject, not names)

______________________________

Provider ________________________________

Verbal Consent (Y/N)

Mini-Cog Score _________________

Time to Complete MoCA and FAQ (in minutes) ________________________

Interventions needed?
________________________________________________________________________
________________________________________________________________________

Drake, K. D. (2017). Drake QI Project-Data Intake©
Appendix F

Drake Likert Scale: Evaluating Alzheimer’s Dementia Screening Quality Improvement Project

Please complete the following survey with specific regard to the above enquiry, by placing a circle on the appropriate response that best applies to you. Select only one response per question. The responses are on a 5-point Likert scale with 1= strongly disagree; 2= disagree; 3= neither or N/A; 4= agree; and 5= strongly agree. Please do not write your name or date of birth on this survey. All responses are kept confidential.

1. How effective do you think the MoCA screening tool is?

   - Very Poor
   - Poor
   - Fair
   - Good
   - Very Good

2. How effective do you think the FAQ screening tool is?

   - Very Poor
   - Poor
   - Fair
   - Good
   - Very Good

3. How effective do you think the combination of MoCA and FAQ screening tools are?

   - Very Poor
   - Poor
   - Fair
   - Good
   - Very Good

4. How do you feel the combinations of the two are in terms of time-efficiency?

   - Very Poor
   - Poor
   - Fair
   - Good
   - Very Good

5. How would you rate your recommendation to repeat this project at another site?

   - Very Poor
   - Poor
   - Fair
   - Good
   - Very Good

6. Comments/ Questions/ Suggestions

Legend:

- Very Poor = 0
- Poor = 1
- Fair = 2
- Good = 3
- Very Good = 4

Drake, K. D. (2017). Drake Likert Scale ©
## Appendix G

### Financial Budget

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<tr>
<th>Item</th>
<th>Cost</th>
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<td><strong>Physical Materials</strong></td>
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<tr>
<td>2 reams of standard white 8x11.5” printing paper</td>
<td>$14.00</td>
</tr>
<tr>
<td>1 18-pack of standard black ballpoint pens</td>
<td>$5.00</td>
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<tr>
<td>Copying/ Printing of project handouts/ Drake Likert surveys/ Drake QI</td>
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<td>Data Intake</td>
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<td>Food supply for first nursing meeting</td>
<td>$20.00</td>
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<tr>
<td><strong>Computer Information Systems</strong></td>
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<tr>
<td>Laptop equipped with Microsoft Excel and SPSS software</td>
<td>$1,500.00 (not included in total cost of</td>
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<td>project as this is owned by the DNP student)</td>
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<td><strong>Personnel</strong></td>
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<tr>
<td>DNP as project investigator</td>
<td>3 credits ($750 per credit)= $2,250.00</td>
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<tr>
<td>(Not included in total cost given educational benefits of project</td>
<td>incurred by DNP student)</td>
</tr>
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<td>registered by DNP student)</td>
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</tr>
<tr>
<td>Registered Nurse</td>
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</tr>
<tr>
<td></td>
<td>average of 32.92 minutes which is $16.45.</td>
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<td>14x 16.45 = 230.30</td>
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<td>Travel expenses to/from clinic setting (private car)</td>
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<td><strong>Project Space for Program Implementation</strong></td>
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<td>Meeting spaces (located within practice settings in both locations)</td>
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<td>practice setting. I.e. nursing break room,</td>
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<td>conference room)</td>
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<td><strong>Total Cost/Expenses</strong></td>
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## Appendix H

### Timeline

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Appendix I

MoCA Screening Tool Approval

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Thank-you for your interest in the MoCA®,

Kathleen Gallant, MSOT Occupational Therapist/ Psychometrician On behalf of Dr Ziad Nasreddine, Neurologist, MoCA® Copyright Owner MoCA Clinic & Institute 4896 Taschereau Blvd, suite 230 Greenfield Park, Quebec, Canada, J4V 2J2 Tel: (450) 672-7766 #222 Fax: (450) 672-3899 kathleen.gallant@mocaclinic.ca www.mocatest.org / www.alzheimer.TV
Appendix J

FAQ Screening Tool Approval

GratPerm

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Tel: +44(0)1865 354454 | Email: louise.eyre@oup.com | www.oxfordjournals.org
MEMORANDUM – Not Human Subject Research Determination

Date: July 26, 2017
To: Kirstin Drake, Nursing

Project Title: Alzheimer’s Screening in Primary Care: Quality Improvement Project to Identify Those at Risk

IRB Number: 17-123

The Human Research Protection Office (HRPO) has evaluated the above named project and has made the following determination based on the information provided to our office:

☐ The proposed project does not involve research that obtains information about living individuals.

☐ The proposed project does not involve intervention or interaction with individuals OR does not use identifiable private information.

☒ The proposed project does not meet the definition of human subject research under federal regulations (45 CFR 46).

Submission of an IRB application to University of Massachusetts Amherst is not required.

Note: This determination applies only to the activities described in the submission. If there are changes to the activities described in this submission, please submit a new determination form to the HRPO.

Please do not hesitate to call us at 413-545-3428 or email humansubjects@ora.umass.edu if you have any questions.

[Signature]

Iris L. Jenkins, Assistant Director
Human Research Protection Office