

2020

## Nurse Practitioner Approach to Care for Peripheral Vascular Disease

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# Walden University

College of Health Sciences

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Walden University  
2020

Abstract

Nurse Practitioner Approach to Care for Peripheral Vascular Disease

by

Jessica Wozniak

MSN, Walden University, 2017

BS, Eastern Michigan University, 2005

Project Submitted in Partial Fulfillment  
of the Requirements for the Degree of  
Doctor of Nursing Practice

Walden University

February 2021

## Abstract

The Amputation Coalition indicates that there were approximately 2 million people with limb loss in the United States primarily caused by peripheral vascular disease in 2019. Those with amputation related to vascular disease have a 5-year mortality rate. The gap in clinical practice at the facility used for this project is that there were no comprehensive program guidelines for nurse practitioners and other health care professionals working with people who are at risk for vascular intervention or limb loss. The practice-focused question was answered that an interprofessional team did develop a prototype for a comprehensive peripheral vascular program that serves as guidance for providers, staff, and patients. The framework utilized for this project followed the clinical scholar model developed by Strout and the Walden University Clinical Practice Guideline Manual. The guideline created for a comprehensive peripheral vascular program aligned with the American Heart Association 2016 Peripheral Arterial Disease guidelines. An expert panel of three key stakeholders, two vascular surgeons and a nurse practitioner, used the Appraisal of Guidelines Research and Evaluation II model. Consensus was achieved on the new practice guidelines at 66% to 33%, agree to strongly agree and inversely for 10 to 12 items consecutively, one topic was doubled, and two were split for partially agree, agree, and strongly agree. The creation of a comprehensive peripheral vascular program practice clinical guideline for nurse practitioners and other health care professionals may improve the care for the population at risk for peripheral vascular disease. The positive social change is the promotion of patient education and self-management of peripheral vascular disease, leading to fewer amputations and an improved quality of life.

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## Dedication

I dedicate this doctoral of nursing project to my family, especially my spouse, Brian and six children: Austin, Isabella, Elijah, Uriah, Owen, and Melody.

## Acknowledgments

I first would like to acknowledge God, for the time and understanding in allowing me to pursue this path in nursing and life! Further, I would like to thank my family members, friends, and faculty, especially Dr. Catherine Garner, who have helped me reach my goal in completing the highest level of nursing education possible.

Additionally, I would like to recognize Dr. John Matsuura, Dr. Kamran Jafree, Dr. Laura Peterson, Dr. Murtuza Habeeb, Dr. Mukul Chandra, and Leandra Gray, MSN, APRN-CNP, FNP. The time and energy I have taken to complete my education will not be forgotten. The advice and conversations we have partaken will forever be with me and continue along my life's journey. The time you have given me in conjunction with any encounter and personal time you have allotted me will allow me to give back to each of you and the community. Thank you.

## Table of Contents

List of Figures.....	iii
Section 1: Nature of the Project.....	1
Introduction.....	1
Problem Statement.....	2
Purpose.....	3
Nature of Doctoral Project.....	4
Significance.....	5
Summary.....	6
Section 2: Background and Context.....	7
Introduction.....	7
Concepts, Models, and Theories.....	7
Relevance to Nursing Practice.....	9
Local Background and Context.....	12
Role of the DNP Student.....	13
Summary.....	14
Section 3: Collection and Analysis of Evidence.....	15
Introduction.....	15
Practice-Focused Question(s).....	15
Sources of Evidence.....	16
Analysis and Synthesis.....	17
Summary.....	19



Section 4: Findings and Recommendations .....	20
Introduction.....	20
Findings and Implications.....	20
Practice Guideline Recommendations .....	24
Medical Management.....	25
Guidelines for Patient and Family Education .....	28
Contribution of the Doctoral Project Team .....	29
Strength and Limitations of the Project .....	29
Summary .....	31
Section 5: Dissemination Plan .....	32
Introduction.....	32
Analysis of Self.....	33
Summary .....	35
References.....	36
Appendix A: Appraisal of Guidelines, Research and Evaluation (AGREE) II	
Domains .....	43
Appendix B: Vascular Specialist Clinical Guide.....	44
Appendix C: AGREE II Rating of Clinical Practice Guidelines Tool.....	47
Appendix D: Disclosure to Expert Panelist Form for Anonymous Questionnaires .....	48

## List of Figures

Figure 1. Clinical scholar model.....	8
Figure 2. AGREE II rating of clinical practice guidelines.....	23
Figure B2. Nurse practitioner vascular specialty checklist tool .....	46

## Section 1: Nature of the Project

### **Introduction**

Nearly half (48% totaling 121.5 million individuals in 2016) of all adults in the United States have some type of cardiovascular disease, according to the American Heart Association's Heart and Stroke Statistics (Benjamin et al., 2019). Peripheral arterial disease (PAD) happens when there is a narrowing of the blood vessels outside the heart due to atherosclerosis (National Institutes of Health [NIH], 2020). This causes the arteries to narrow or become blocked and can reduce or stop blood flow, usually to the legs. If severe enough, blocked blood flow can cause tissue death and can sometimes lead to amputation of the foot or leg. PAD affects around 8.5 million people in the United States and an estimated 202 million people worldwide over 40 years of age leading to significant morbidity, mortality, and poor quality of life (Gerhard-Herman et al., 2017).

The Amputation Coalition (2019) indicates there are about 2 million people with limb loss in the United States primarily caused by peripheral vascular disease. Those with amputation related to vascular disease have a high mortality rate within 5 years (Amputation Coalition, 2019). Nurse practitioners can help educate and intervene with preventive and early management practices. The gap in practice was the lack of comprehensive peripheral vascular program clinical guidelines at a medical center. The purpose of this project was to use current literature to establish peripheral vascular program guidelines that nurse practitioners can utilize for improving care for patients at risk of surgical intervention and amputation due to peripheral vascular disease. The

positive social change is the promotion of patient education and self-management of peripheral vascular disease leading to fewer amputations and an improved quality of life.

### **Problem Statement**

Nurse practitioners are assuming more primary care duties which includes chronic disease management. In this clinical practice setting, the gap in nursing practice was that there is no comprehensive clinical program to work with those at risk for vascular surgical intervention or amputation due to peripheral vascular disease. A comprehensive clinical program with best practice guidelines for management of peripheral vascular disease with education and support for patient self-care management has the potential to optimize patient health and limit amputation risk.

Many peripheral vascular patients are tobacco users, obese, and have diabetes, hypertension, and high cholesterol. There is an increased risk for peripheral vascular disease after age 65 (Gerhard-Herman et al., 2017). However, those 50-64 years old have risk for atherosclerosis with associated comorbidities of diabetes mellitus, history of smoking, hyperlipidemia, hypertension, or family history of PAD (Gerhard-Herman et al., 2017). People with diabetes mellitus younger than 50 years old are still at risk for atherosclerosis and that risk increases with another comorbidity (Gerhard-Herman et al., 2017). Also anyone with atherosclerosis identified in another vascular bed such as the heart, carotids, renals etc. are at increased risk for peripheral vascular atherosclerosis. (Gerhard-Herman et al., 2017).

Management of peripheral vascular disease requires medications and education to encourage a commitment to lifestyle changes regarding diet and exercise, and smoking

cessation (U.S. Department of Health & Human Services (USDHHS), 2016).

Pharmacotherapy should include antiplatelet and statin agents in addition to customization of other medications to address other atherosclerotic risk factors (Gerhard-Herman et al., 2017). However, inconsistent compliance with the plan of care in a vascular patient leads to higher incidence of poor outcomes and amputations. Clinical follow up and ongoing education is an important part of preventing amputation (USDHHS, 2016). Specific to diabetic patients is education about self-foot examinations, seeking care immediately with wounds, and more emergent care when there is a concern about infection. This is important to minimize tissue loss leading to high incidence of limb loss (Gerhard-Herman et al., 2017). Inconsistent compliance with the plan of care in vascular patients leads to higher incidence of poor outcomes and limb loss. Therefore, the development of a comprehensive vascular program would assist nurse practitioners in caring for vascular patients and in improving patient self-management, leading to decreased limb loss and mortality. Should this program prove effective, this could be replicated in other practices across the nation.

### **Purpose**

The gap in nursing practice is that there were no comprehensive vascular program guidelines for the population at risk for surgical intervention or amputation at the medical center when I conducted this project. Developing and adopting new clinical practice guidelines would address this gap in practice. The practice-focused question was: Will an interprofessional team develop a prototype for a comprehensive peripheral vascular program that serves as guidance for providers, staff, and patients?

Wounds and ulceration lead to the risk of worsened wounds, infection, and primary or secondary limb loss based on various comorbidities (Bruno, Wiersema, & Meka, 2018). Nurse practitioners have the opportunity to educate patients about the importance of managing diabetes through foot assessment, management of hemoglobin A1c (HbA1c) levels, and providing smoking cessation counseling. Nurse practitioners are capable of providing appropriate wound care, vascular assessment with imaging, and routinely referring patients to specialists as needed. They bring a level of expertise to a multidisciplinary team approach for a peripheral vascular program which has the intention of limb loss prevention (Johnson, Osbourne, & Rispoli, 2018; Tumolo, 2018; Williams, Powell-Chandler, Qureshi, Zaidi, & Whitaker, 2018).

### **Nature of Doctoral Project**

The framework utilized for this project followed the clinical scholar model developed by Strout (2009) and the Walden University Clinical Practice Guideline Manual which incorporates the Appraisal of Guidelines Research and Evaluation (AGREE) II tool (Walden University, 2017). The clinical guideline development focused on safe and effective care provided by nurse practitioners to their patients based on evidence-based research and practice. The literature review was conducted using databases accessed through Walden library and included peer-reviewed, full text evidence-based practice articles published over the past 5 years (2016-2020) and also relevant seminal works published prior to that time. The American Heart Association/American College of Cardiology (AHA/ACC) 2016 Guideline for

Management of the Patient with Peripheral Vascular Disease was used for modeling (Gerhard-Herman et al., 2017).

The guideline addressed strategies to improve patient medication compliance and adopt lifestyle changes needed to improve health and quality of life. Utilizing this approach has the potential to close the gap in practice for nurse practitioners. It provides comprehensive care to patients with peripheral vascular disease who are at risk for surgical vascular intervention or amputation.

### **Significance**

Creating and implementing a comprehensive peripheral vascular program (PVP) is important to the patient, family members, nurse practitioners, surgeons, primary care physicians, and other health care staff. Improving care with clinical practice guidelines may result in improved compliance and self-care management by patients, thus ultimately decreasing morbidity and mortality. Potential contributions of this PVP demonstrate the need for nurse practitioners, physicians, and vascular surgeons to communicate and collaborate with podiatrists, endocrinologists, cardiologists, wound care specialists, and primary care physicians caring for those with atherosclerotic disease. Further, I hope that the Society for Vascular Nursing (SVN) and Society for Vascular Surgery (SVS) may endorse the adoption of the PVP model clinical practice guidelines. This can lead to even greater social change throughout the SVN and SVS communities and internationally.

The United States is working to assemble an electronic database, the Limb Loss and Preservation Registry, to help assess and study adults and children across the life span of amputations (Cone, 2018). This registry will assist in collecting information for

the prevention, treatment, and rehabilitation for those that have lost their limbs (USDHHS, 2018). This information will further inform nurse practitioners of the scope of the issue.

### **Summary**

Over 2 million documented people suffered from limb loss in the United States, with over 185,000 amputations occurring annually. The gap in this vascular practice is that there is a need for a comprehensive peripheral vascular program with specific guidelines on medical care and patient education. The purpose of the project is to work with an interprofessional team for the development of these program guidelines. Nurse practitioners working alongside vascular surgeons and their patients and family members are the starting point in personal health promotion toward positive social change. Health promotion with proper nursing education and follow up may help decrease vascular morbidity and mortality (Galvin, Webb, & Hillier, 2001; Morais, Nobrega, & Carvalho, 2018). Section 1 discussed the nature of the doctoral project, problem statement, purpose, and significance to nursing practice. Section 2 will provide additional information on the background and context of this study.



## Section 2: Background and Context

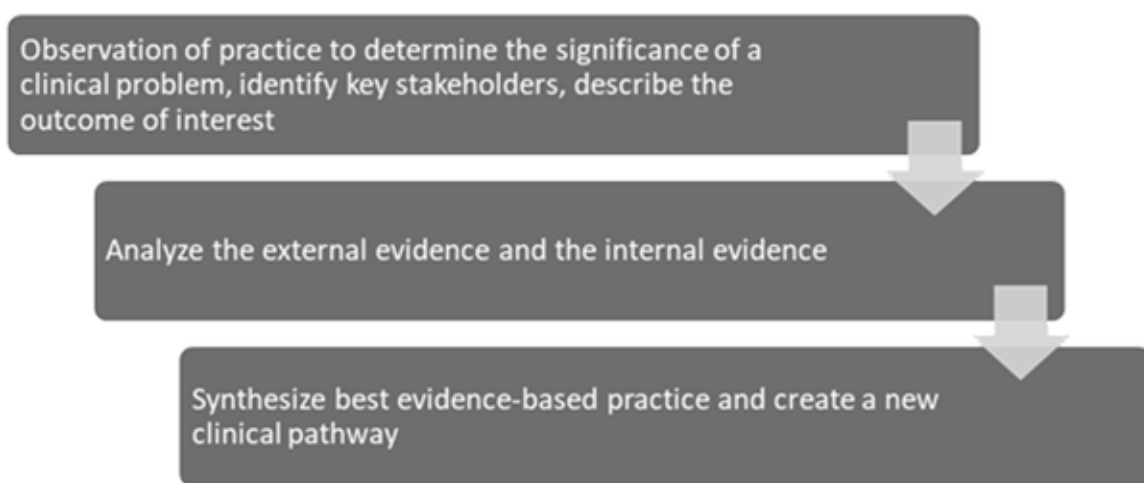
### **Introduction**

Limb loss is a growing population health concern due to peripheral vascular disease. The gap in clinical practice is that there was no comprehensive clinical program for patients at risk for vascular surgical intervention or amputation at the medical center where this project was created. The practice-focused question asked: Will an interprofessional team develop a prototype for a comprehensive peripheral vascular program that serves as guidance for providers, staff, and patients? The purpose of this project was to use a multidisciplinary approach to developing comprehensive peripheral vascular program clinical guidelines for the population with peripheral vascular disease who are at risk for surgical intervention and amputation. This section discusses the concepts, models, and theories, relevance to nursing practice, local background and context, and role of the DNP student.

### **Concepts, Models, and Theories**

The clinical scholar model was developed by Strout and a team of nurses at the Maine Medical Center in Portland Maine (Strout, Lancaster, & Schultz, 2009). This model describes the steps in improving patient care through research, evidence-based practice, and quality improvement. The first step is observation of a clinical practice problem and assessment of the significance of the clinical problem. Internal evidence may include quality data, risk management data, patient satisfaction, and outcome data obtained from medical record review. The model emphasizes the importance of engaging clinical stakeholders and forming an inter-disciplinary team to establish the desired

clinical outcomes. The second step is gathering external evidence from the literature, national guidelines, and professional associations and then to critique this evidence using a level of evidence tool. The next step is synthesis of the evidence and the production of a new policy, protocol, or clinical pathway. The final steps, which are beyond the scope of this study, are application in the clinical setting, evaluation of outcomes, and dissemination of knowledge.



*Figure 1.* Clinical scholar model. Adapted from Strout, Lancaster, & Schultz, 2009

The Clinical Practice Guideline Manual from Walden University which stipulates the AGREE II Method was also used as a framework for this study. There are six domains with a total of 23 items used to critically appraise the guideline according to Zaccagnini and White (2017). All six domains of the AGREE method and each of the 23 elements are listed in Appendix A. The purpose of the AGREE II instrument is to grade clinical practice guidelines by assessing the quality of research, giving a strategic approach to the guideline development methodologically, and including how and what

information should be reported in the guidelines (see Brouwers et al., 2017) for peripheral vascular disease.

Peripheral vascular disease is an umbrella term for peripheral arterial disease (PAD) also known as arterial insufficiency; peripheral vascular disease also includes venous insufficiency (Berti-Hearn & Elliott, 2018). PAD is atherosclerosis of the peripheral arteries in both upper and lower extremities, with the lower extremities associated with the most common form of PAD (Berti-Hearn & Elliott, 2018). Atherosclerosis of peripheral arteries are the noncoronary arteries that result in calcification and plaque build-up within the arterial walls causing vessel stenosis and occlusion (Berti-Hearn & Elliott, 2018; Sibley et al., 2017). Both arteries and veins have valves where arteries carry blood away from the heart and veins bring it back. The arterial valves are made for higher pressure and pulsating blood flow where the vein valves are intended for backflow prevention (Berti-Hearn & Elliott, 2018). When venous valves are incompetent, backflow results causing venous insufficiency.

### **Relevance to Nursing Practice**

Nurse practitioners are growing and leading in patient primary care and within their specialty dealing with more chronic health conditions. The primary focus in the medical and surgical literature is directed towards surgeons who predominantly diagnose and treat the peripheral vascular disease patient surgically due to critical limb ischemia (Kohlman-Trigoboff, 2019). The vascular program in this acute care setting focuses primarily on consultation for surgical intervention, surgery, and minimal postoperative follow up with the surgeons. Once the peripheral vascular disease patient is treated

surgically, the surgeon has limited time and resources to monitor the patient long term medically unless they require further surgical intervention. There is a need for a program that offers wound care, diabetic management, preventative care, screening services, and medical treatment options alongside surgical options (Fuller, 2015).

Nurse practitioners have the capability to medically manage the peripheral vascular disease patient surrounding surgical intervention and through prevention of primary or secondary surgery reducing mortality outcomes. The development of a comprehensive peripheral vascular program with guidelines for comprehensive peripheral vascular management will enhance the care for the vascular patient. Evidence has shown nurse practitioners can play a significant role in the management of chronic diseases (Health Quality Ontario, 2013).

Peripheral vascular disease patients often have comorbidities like diabetes, heart disease, cholesterol problems, obesity, and chronic wounds that all may be debilitating if not medically managed (Fuller, 2015). Seventy five percent of people suffering from PAD also have heart disease and are four to six times more likely to suffer a heart attack or stroke (Fuller, 2015). The common treatment is a daily aspirin (antiplatelet) and daily statin medication that can be managed and monitored by a nurse practitioner (SVS, 2018).

There are several risk factors that can be managed by nurse practitioners. Known risk factors for morbidity and mortality associated with peripheral vascular disease include tobacco use, diabetes, hypercholesterolemia, heart disease, poor nutrition, obesity, and the lack of patient assessment (Dalsing, 2018). According to the SVS (2018),

most people do not know when to refer their patient to the vascular surgeon, and when they do, the vascular disease is past the point of management other than with surgical intervention or amputation. With early referral patients can be screened and preventative measures initiated as vascular surgeons do not solely deal with varicose vein surgery, should not be associated with the heart primarily, but also extremity wounds, unexplained leg pain, difficulty controlling hypertension, and abnormal pulses or vascular studies (SVS, 2018).

Incorporating best practice evidence into a vascular program with the support of key stakeholders, the nurse practitioner will be able to care for and treat the whole patient. According to the literature, nurses are able to closely monitor the vascular patient by extremity assessment through assessing color, temperature, capillary refill, edema, presence and intensity of pulses, pain, and motor function (Berti-Hearn & Elliott, 2018). Postoperatively, nurses should monitor for surgical site infections and bleeding (Berti-Hearn & Elliott, 2018). Also, nurses are encouraged to educate patients about walking regimens, monitoring self for wounds and ulcerations, and compliance with medications (Berti-Hearn & Elliott, 2018). The remainder of the literature is focused on the physician caring for the patient and is not specific to nurse practitioners. However, nurse practitioners are licensed and capable to order and interpret images, manage medications, and physically assess patients, monitor for signs of worsening peripheral vascular disease, and educate the patients in collaboration with the vascular surgeon (Kohlman-Trigoboff, 2019; Ohio Rev. Code § 4723.43, 2020). Nurse practitioners will assist with

closing the gap in nursing practice for vascular medicine and preventing further surgical intervention and limiting limb loss for the peripheral vascular disease patient.

### **Local Background and Context**

Nationally the vascular specialty has been underutilized (Conte et al., 2019; Conte et al., 2015). In areas that have a vascular program, it is undermanaged, lacking the due diligence health care providers owe to their patients (Tumolo, 2018; Williams et al., 2018). Creating a vascular program that is able to screen people and prevent surgical intervention through revascularization or amputation will guide the future of vascular medicine (Williams et al., 2018). Patients and families often do not comprehend that they have a vascular problem (Lecouturier et al., 2019). Similarly, one in four people not diagnosed with diabetes are actually diabetic; however, the individual is unaware because they have not been monitored and screened properly (SVS, 2019). Therefore, the diabetic patient goes untreated until they complain of leg pain and develop a wound as they lost sensation in their feet and did not realize it, leading to a late diabetic diagnosis and vascular referral (SVS, 2019; SVS, 2018).

The local vascular surgeon specialists and area stakeholders recognize this dilemma and understand the need for a medical vascular program that the nurse practitioner can coordinate care for this population. The clinical practice is supportive of this endeavor, and they consider this project quality improvement and it will not require hospital Institutional Review Board (IRB) approval. This document was submitted to the Walden University IRB per ethical standards and federal United State regulations (see Appendix D) (Walden University, 2019a).

### **Role of the DNP Student**

As a doctoral nursing program student practicing as a nurse practitioner in a vascular surgery outpatient and inpatient setting, I quickly saw a need to help people understand their disease and how they can improve their health and prevent further advancement of peripheral vascular disease. Many patients stated that they did not even know they have diabetes, chronic kidney disease, heart disease, or wounds on their feet. Some are shocked that the pain in their lower extremities could improve with the proper management. When they arrive in our office they are scared that they are in need in having surgery, and wonder why no one told them about peripheral vascular disease management before.

I have witnessed first-hand how a person comes in with a wound that is attempted to be managed with surgical intervention. Then that wound does not heal because the patient is noncompliant or limb salvage was too late, and revascularization versus amputation is attempted. Then amputation is inevitable. Next the below the knee amputation must be converted to an above the knee amputation and then sometimes death within weeks. I have only been in this field for a year and a half and have witnessed too many encounters that I know could have a better outcome if managed differently.

I reviewed and provided the team with a synopsis of the literature. Various stakeholders were presented with a draft and asked to create and revise a clinical practice guide. I further discuss the team demographics and roles in another section. I have no bias to this project. I am an employee at this facility and acting in my role of patient advocate and quality improvement champion. The hope is to educate patients, the

community, and other professionals that they have a vascular option medically with compliance and early referral and treatment.

### **Summary**

The initial drive for the program is the medicine side of the vascular specialty as it relates to nursing practice, and with by-in from the surgeons and other care specialties such as cardiologists, podiatrists, wound care specialists and the patient's primary care providers. The literature review was predominately surgical in approach to peripheral vascular disease, but the AHA/ACC has developed guidelines for the medical and surgical management of the patient with PAD. The literature supports the nurse practitioner role in the coordination of care through a comprehensive vascular management program. Section 3 will provide more on the collection and analysis of evidence.



### Section 3: Collection and Analysis of Evidence

#### **Introduction**

The Amputation Coalition (2019) indicates there are about 2 million people with limb loss in the United States primarily caused by peripheral vascular disease. The clinical practice problem was that a comprehensive program did not exist for the comprehensive care of those at risk for surgical intervention or amputation at the medical center where this project took place. The purpose of this DNP project was to coordinate an expert panel of key stakeholders in the creation of a comprehensive peripheral vascular program practice clinical guideline for nurse practitioners and other health care professionals to improve the care for the population at risk for peripheral vascular disease. Section 3 will discuss the collection and analysis of evidence.

#### **Practice-Focused Question(s)**

The gap in nursing practice is that there was no comprehensive program to work with those at risk for surgical intervention or amputation. Therefore, adopting new clinical practice guidelines would address this gap in practice. The practice-focused question was: Will an interprofessional team develop a prototype for a comprehensive peripheral vascular program that serves as guidance for providers, staff, and patients? Wounds and ulceration lead to the risk of worsened wounds, infection, and primary or secondary limb loss based on various comorbidities (Bruno et al., 2018). Nurse practitioners have the ability to educate about the importance of managing diabetes through foot assessment, assessing hemoglobin A1c, and providing smoking cessation counseling. There is a need for a program that offers wound care, diabetic management,

other preventative care, screening services, and medical treatment options alongside surgical options (Fuller, 2015). Also, a program is needed to provide appropriate wound care, along with proper vascular assessment to include imaging and routinely referring patients to specialists as needed (Kohlman-Trigoboff, 2019). Using a multidisciplinary team approach with the intention of limb loss prevention is an important component of care (Johnson et al., 2018; Tumolo, 2018; Williams et al., 2018).

### **Sources of Evidence**

This project utilized several resources available including literature review through the Walden library databases. Key words initially used for the search included: *peripheral vascular disease, PVD, arterial disease, limb loss, amputation, education, prevention, treatment, ankle-brachial index, ultrasound, noninvasive imaging, smoking cessation, tobacco abuse, nursing, practitioner, best practice, approach, cholesterol, diabetes, obesity, hypertension, atherosclerosis, diet, exercise, management, clinical practice, and risk*. Inclusion criteria consisted of English only scholarly peer-reviewed full-text articles, primarily in the last 5 years. For the purposes of this project I did open the time range to see that first article on a comprehensive approach to peripheral vascular disease management which was dated from 2001. Otherwise, exclusion criteria consisted of articles greater than 5 years old, as well as those predominantly pertaining to pediatrics, or limb loss primarily from trauma or cancer.

The review included the guidelines found in the 2016 AHA/ACC guide in managing people with lower extremity PAD, which does discuss the relationship of claudication, rest pain, life-style limiting ability, abnormal pulse examinations, lower

extremity gangrene, nonhealing wounds, and elevated pallor or dependent rubor (Gerhard-Herman et al., 2017).

The literature was reviewed for a guideline to help care for vascular patients in this organization from a nursing perspective. There were limited guidelines that were comprehensive; most varied from one procedure to the next and rarely referenced care across the medical specialist spectrum. A total of 12 were referenced with the majority following the 2016 AHA/ACC guidelines. The clinical practice guideline was created, discussed and updated, and then graded using the AGREE II tool among the key stakeholders.

The team consisted of the nurse practitioners and surgeons currently working in the vascular specialty. A cardiologist, podiatrists, and wound care specialists who work with peripheral vascular disease patients also on a routine basis were asked for further input into the program guidelines. All members were asked to bring evidence-based literature to the group. Members were volunteers and told of the purpose of the project, their role, and the time commitment. The project was held using virtual meeting software to minimize direct human contact during the coronavirus emergency.

### **Analysis and Synthesis**

The purpose of a clinical guideline is for practitioners to develop safe and effective care based on evidence and obtained knowledge toward the specific population. Eight defined principles in the Manual for Clinical Practice Guideline Development (CPGD; Walden University, 2017) include:

Describe appropriate care based on the best available scientific evidence; reduce preventable variations in practice; provide a rational basis for referral; provide focus for continuing education; promote efficient use of resources; provide a focus for quality control, including audit; highlight gaps in the existing literature; and to suggest appropriate areas for future research. (Walden University, 2017, pp. 1-2)

There was a need to develop and create a clinical practice guideline for the vascular specialty. Numerous discussions with the vascular surgeons, vascular nurse practitioners, and wound care specialists, podiatrists, and cardiologists were held on approaching care as a team for the vascular patient with the focus around limb salvage.

The most current guidelines and evidence-based practice research were evaluated using the GRADE criteria in order to select those of highest quality for the team to review. GRADE criteria is a guideline for assessment, development, and evaluation of the literature based on evidence for practice implementation (Gray, Grove, & Sutherland, 2017). Literature review was synthesized and included the levels of evidence hierarchy pyramid (Gray et al., 2017; Zaccagnini & White, 2017). While prevention of peripheral vascular disease is important, this project also focused on the comprehensive management of those who have the diagnosis of peripheral vascular disease and are at risk for further complications such as the development of limb ischemia. The guidelines were primarily focused on plans for medical management and patient self-management of risk and early identification of wounds, as well as early and efficient wound management. This is an important step in preventing amputations.

### **Summary**

The clinical practice problem was that no comprehensive program existed for the comprehensive care of those at risk for surgical intervention or amputation. The purpose of this DNP project was to coordinate an expert panel of key stakeholders in the creation of a comprehensive peripheral vascular program practice clinical guideline for nurse practitioners and other health care professionals to improve the care for the population at risk for peripheral vascular disease. The team used the Walden guideline development principles. Section 4 will discuss the findings from the process and recommendations for the comprehensive peripheral vascular program.

## Section 4: Findings and Recommendations

### **Introduction**

There is a need for a comprehensive program to work with those at risk for vascular surgical intervention or amputation. To address this gap in practice, I created a new clinical practice guideline for adoption. The practice-focused question was: Will an interprofessional team develop a prototype for a comprehensive peripheral vascular program that serves as guidance for providers, staff, and patients? The purpose of this project was to review the sources of evidence applying the GRADE criteria, develop guidelines, review the modifications based on the AGREE II rating tool (see Appendix A), and create the final peripheral vascular program clinical practice guideline for organizational approval. The implementation is beyond the scope of this project.

### **Findings and Implications**

The literature review was conducted using predominantly Walden library databases and professional organization guidelines. The database was set at full text and the key words searched first were *peripheral vascular disease* or *PVD* or *peripheral arterial disease* or *PAD* with the result of 322,804 articles. Filters added included date range 2016-2020 and peer reviewed scholarly journals only. Then the search was filtered in the following sequences *limb loss* or *amputation* or *treatment* or *best practice* or *risk* or *clinical practice* or *guideline* or *approach* or *management* AND *testing* or *education* or *prevention* or *ankle-brachial index* or *ABI* or *ultrasound* or *doppler* or *noninvasive imaging* AND *smoking cessation* or *tobacco abuse* or *cholesterol* or *diabetes* or *obesity* or *hypertension* or *atherosclerosis* or *diet* or *exercise* or *blood sugar* or *blood pressure* or

*HTN or HbA1c AND nursing or practitioner or compliance NOT pediatric or trauma or cancer* with the results sequentially 48,116 before the added filter; then 23,848; 6,093; 3,304; 195; 188 consecutively. Finally, English only articles were requested resulting in 92. After all the duplicates were removed along with other nonrelevant articles, 37 more were excluded leaving 55 for review.

Articles were pulled from credible sources and compared to vascular clinical practice guidelines. The SVS had several documents written over the years that discussed individual surgical techniques, but not from a medical prevention perspective. They do not have a clear-cut guideline that is all inclusive for a comprehensive approach to care. The document used for the majority of this project discussion was the 2016 AHA/ACC Guidelines. This document mostly includes recommendations for practitioners to follow, including algorithms for PAD and critical limb ischemia (CLI) and other vascular diseases, without a direct line of treatment from a medical standpoint (Gerhard-Herman et al., 2017). A total of 12 references and guidelines were used for the development of this prototype. An expanded date range yielded one article dated 2001, one from 2015, one from 2016, two from 2017, four from 2018, and three from 2019.

The literature indicates that vascular disease is a broad complex disease. The peripheral vascular specialty is primarily led by vascular surgeons. The vascular specialty has primarily focused on surgical management and lacks a comprehensive program to provide the best quality of care for the peripheral vascular disease patient which include a medical approach (Conte et al., 2019; Conte et al., 2015; Gerhard-Herman et al., 2017). The literature suggests that peripheral vascular disease patients require comprehensive

care across the health spectrum. While there are separate guidelines for vascular specialty care, primary care, and podiatry, there is not one comprehensive reference for every vascular disease nor is there continuity. This is consistent with this hospital's current practice within the associated vascular program. This review of the literature supported the need for a comprehensive vascular program.

The preliminary guidelines were written and modified based on discussions among the team members and the vascular surgeons' perspectives regarding the best practice in prevention or treatment. Specialists in the field of vascular medicine and surgery, cardiology, podiatry, wound specialists, family medicine were important team members. Several meetings and drafts were required to achieve consensus among the team members. The steps in revisions incorporated the use of the AGREE II tool, which guided the final validation of the proposed guideline.

The project was to create guidelines for clinical practice in a comprehensive peripheral vascular program that is both a teaching tool and guideline for providers, staff, and patients. This is a multistep tool for a complete interprofessional team approach in caring for the vascular patient (Appendix B). Part I of the guidelines is preferred medical treatment that happens prior to referral to a vascular specialty office. Part II is a more detailed breakdown of how the vascular team will triage the patient into the correct pathway of care. Key stakeholders participated in reviewing this two-part guide, then had the opportunity to use the AGREE II tool to grade the completed guideline. The key stakeholders included vascular surgeons currently active in practice. Other key stakeholders for review of this clinical practice guideline included current practicing



nurse practitioners in the surgical vascular specialty from the clinical setting and a cardiologist were invited to use the AGREE II tool.

The results of the AGREE II Rating of the Clinical Practice Guidelines follow in Figure 3. In summary, 12 areas were rated strongly agree by 66% with the inverse 33% as agree, 10 areas were rated as agree by 66% and the inverse 33% were strongly agree, and only two of the 23 items were each a third split for partially agree, agree, and strongly agree. Those two items were systematic methods used to search for evidence and the criteria for selecting the evidence are clearly described in Items 7 and 8 consecutively.

**AGREE II RATING OF CLINICAL PRACTICE GUIDELINES**

Rating Scale: (1) Strongly Agree, (2) Agree, (3) Partially Agree, (4) Neutral, (5) Partially Disagree, (6) Disagree, (7) Strongly Disagree

Domain	SA	A	PA	N	PD	D	SD
1. The overall objective of the guideline is specifically described	1	2					
2. The health question covered by the guideline is specifically described	1	2					
3. The population to whom the guideline is meant to apply is specifically described	2	1					
4. The guideline development group includes individuals from all the relevant professional groups	2	1					
5. The views and preferences of the target population have been sought	1	2					
6. The target uses of the guidelines are clearly defined	1	2					
7. Systematic methods were used to search for evidence	1	1	1				
8. The criteria for selecting the evidence are clearly described	1	1	1				
9. The strengths and limitations of the body of evidence are clearly described	1	2					
10. The methods for formulating the recommendations are clearly described	1	2					
11. The health benefits, side effects and risks have been considered in formulating the recommendations	2	1					
12. There is an explicit link between the recommendations and the supporting evidence	2	1					
13. The guideline has been externally reviewed by experts prior to its publication	2	1					
14. A procedure for updating the guideline is provided	2	1					
15. The recommendations are specific and unambiguous	2	2					
16. The different options for the management of the condition or health issue are clearly presented	1	2					
17. Key recommendations are easily identifiable	2	1					
18. The guidelines provide advice and/ or tools on how the recommendations can be put into practice	2	1					
19. The guidelines describe facilitators and barriers to its application	1	2					
20. The potential resource implications of applying the recommendations has been considered	1	2					
21. The guidelines present monitoring and/ or auditing criteria	2	1					
22. The views of the funding body have not influenced the content of the guideline	2	1					
23. Competing interests of guideline development group members have been recorded and addressed	2	1					

Figure 2. AGREE II rating of clinical practice guidelines

Participation in this process was voluntary, the participants had the option to opt out at any time. All communications were through email or video-conferencing via secure messaging with follow up phone calls and in office discussions. The current pandemic of COVID-19 precluded presenting this clinical practice guideline to a wider scope of individuals who work with vascular patients to include podiatrists, wound care specialists, and other cardiologists. The final proposed guideline will be presented to the appropriate approval bodies.

The implication for positive social change is associated with using this comprehensive vascular program approach to educate providers starting with primary care, cardiology, podiatrists, and wound care specialists. Participation in a coordinated care program will result in best practice multidisciplinary management of this growing population. Consistent medical prevention and early treatment may decrease the need extensive vascular surgical procedures and potentially decrease the risk of amputation. Patients' quality of lives would improve, impacting family and societal well-being.

### **Practice Guideline Recommendations**

The structure of the program would start with a nurse practitioner assessment and referral to the vascular surgeon per protocol. This follows the chronic care model (CCM) which is how people with diabetes have been cared for in the primary care setting (Stellefson, Dipnarine, & Stokpka, 2013). This structure would be coordinated by the comprehensive vascular care coordinator, a nurse practitioner (NP) in the vascular clinic. The patient would work with the NPs and physicians on a care management plan following referral from primary care providers and other specialists. The individual NPs

would implement a comprehensive medical management program beginning with medical management.

NPs are able to run chronic care programs successfully as evidenced by implementation of clinical guidelines, patient education, leadership training, through various communication avenues, monitoring and tracking patient status for compliance and improvement, expedited care and referral (Stellefson et al., 2013). NPs also have the skill set to further train and perform certified wound care (Healogics, Inc., 2019). Chronic wound care management is a comprehensive approach to wound care that expresses the importance of wound care experts based on knowledge and improved wound care outcomes (Healogics, Inc., 2019). A vital team member is the vascular NP as an expert wound care specialist to guide the patient toward expedited healing, decreased amputations, and length of hospital stays post-operatively (Healogics, Inc., 2019). The program coordinator would monitor patient follow-through with self-care through both written and electronic communication.

### **Medical Management**

The recommendations are based on specific qualifications, characteristics, and complaints. This starts with the primary care provider (PCP) or others outside of the vascular specialist office including the cardiologist, wound care specialist, podiatrist, emergency medicine, and others. Patients that present 30 years of age or older, smoke, have diabetes, hypertension, high cholesterol and complain of extremity edema unilaterally or bilaterally with or without pain need a vascular referral. Pain is defined as starting distally in the toes and travelling proximally (known as rest pain); it may be with

or without neuropathy as this may blunt toe pain but the pain travels proximally versus distally from the point of sensation. Pain may be felt with leg elevation at night requiring the patient to awaken and drop their legs off the side of the bed or get up out of bed to relieve the pain. The client may have claudication with ambulation, as pain progresses with each step. Also, the clinician should make a vascular referral if pulses are weak or non-palpable, wounds and ulcers are not healing, there is advanced atherosclerosis, or leg discoloration.

The new guideline added a protocol for NPs to perform two noninvasive tests, both a bilateral arterial doppler ultrasound with ankle-brachial indices (ABI) and toe-brachial indices (TBI), the ABI portion with exercise should be conducted; and a bilateral venous doppler reflux study for those with concern of a vein problem. The venous reflux study ultrasound must be completed with an appropriate tech that is able to perform the study as they check for deep vein thrombosis (DVT), but more importantly venous reflux. If the provider is unsure which test to order, the most appropriate action would be a referral to the vascular specialist.

The next portion of the clinical practice guideline includes the protocol for the vascular nurse practitioners to utilize in coordinating the care of the patient with significant peripheral vascular disease in the comprehensive vascular disease program. This protocol follows a three step process. There is the checklist nurse practitioners need to reference in Appendix B.

Nurse practitioners will first obtain and review the patients vitals, social and medical history, medications, labs, any arterial and venous imaging along with a physical

assessment. During this same initial visit the nurse practitioner will analyze the results for proper care and next steps. Adequate education toward improved health promotion and prevention of further morbidity and mortality risks are included. This is the point that the right referrals will take place including ordering new images, blood work, medications, counseling, and proper follow up with the nurse practitioner or the vascular surgeon. The third guideline phase is ongoing education and follow up for the patient and their family. Most often walking regimens are the key to improved circulation with smoking cessation and other specialized care plans for each individual person.

The purpose of expanding from vascular treatment only into a comprehensive vascular program is that the PCP is an integral part of the plan to routinely monitor the patient's vital signs and labs and is able to make appropriate adjustments to their medications. Medication compliance is an important component for peripheral vascular patients given their co-morbidities of diabetes, hypertension, renal disease and others. These patients may further benefit from a social services consultation and financial support to help them obtain and manage their medications, which could be coordinated by the vascular coordinator or PCP.

Physical assessment in the comprehensive vascular program should also include monitoring the risk for falls by assessing their gait mobility and balance. Patients with high cholesterol and triglycerides also need medicine and intervention. Often the patient needs started on a low dose aspirin and statin medication. Therefore, a lipid panel, hemoglobin A1c, and blood pressure monitoring are necessary. A patient's cholesterol may be within normal range; however, if imaging indicates they have atherosclerosis or

plaque then they should be on a statin and aspirin. Blocked arteries can lead to heart attack, stroke, thromboembolism, gangrene, tissue death, amputation, and mortality.

### **Guidelines for Patient and Family Education**

This guideline includes the education component that everyone on the patient care team should support and reiterate for continuity. This guideline includes a checklist of patient education topics. Additional resources and referrals are provided so that education can be individualized.

Smoking cessation is important, as smoking aids in formation of fatty deposits accelerating plaque growth. If a vascular problem is found and the smoking has not completely ceased, or they restart smoking after surgical intervention the patient is at risk for limb loss. However, the person will need support to want to quit smoking and seek treatment in a smoking cessation program.

A patient needs to be able to exercise, even if that is just short ambulation. A healthier diet can help with maintaining a healthy weight. Patients need to keep their blood glucose under control, as this contributes to atherosclerosis. Diabetic patients need to inspect their feet frequently and should have routine diabetic foot exams.

Ultimately, the effectiveness of guidelines and proposed patient education regarding life-style change and medication compliance would be evidenced by weight loss, serum testing, and recommended noninvasive imaging assessing stable or improved atherosclerosis. The ultimate goal is decreased amputations and revascularization among this population.

### **Contribution of the Doctoral Project Team**

After literature review was conducted it was found that there was no specific guide for healthcare providers to follow in caring for the vascular patient. As the initiator of the project, I spoke with the surgeons on several occasions to clarify and discuss ways to improve the care for the vascular patient. Key stakeholders were contacted and asked for their input of optimal care of vascular patients. This information was coordinated along with the support from various references to create a comprehensive prototype for a comprehensive peripheral vascular program. Next the prototype was reviewed with the key stakeholders and the team reached agreement that it is an appropriate prototype and guide. All participants have worked in vascular for a minimum of three years or longer; the nurse practitioner had three years in vascular medicine and more years in wound care.

While it is beyond the scope of the project, the team will work with the designated NP program coordinator to implement and evaluate this structure and patient outcomes and satisfaction with care. Including the PCP in virtual teams, case reviews will further educate professionals in the community on improved care for the patient with peripheral vascular disease.

### **Strength and Limitations of the Project**

The strength of this project is that a multidisciplinary team worked together on a comprehensive approach to the patient with peripheral vascular disease with a focus on prevention of surgical intervention and patient education. Therefore, the strengths are that this project is supportive and strong for comprehensive care for the peripheral vascular disease patient. Nurse practitioners will be able to care for the whole patient deferring

some referrals, especially for the underserved population that are unable to get into a PCP. Patient and family compliance will grow as the continuity of care is maintained and patient quality of care will improve.

A possible limitation is that this project is predominantly written from a vascular specialty perspective. The key stakeholders included two vascular surgeons and one vascular nurse practitioner. One of the vascular surgeons and the nurse practitioner also have extensive wound care knowledge. This clinical practice guideline prototype was written based on one organization's need. Due to the current pandemic of COVID-19, some providers were unable to participate. Full implementation further limits confirmation that this is a valid guideline; however, based on literature it includes and mirrors the 2016 AHA/ACC Guideline that is referenced in several evidence-based research articles.

This doctoral project was intended for the purpose of creation and development for a clinical practice guideline with intention to serve as guidance for providers, staff, and patients for comprehensive care of the vascular patient. Implementation goes beyond the scope of this project. However, the next step taken for implementation would include IRB approval to perform a prospective study of the outcomes of the program over the next 3 to 5 years. Quality indicators would include rates of infection, medication compliance, morbidity, weight, cholesterol, smoking cessation, amputation, revascularization, and mortality. The implementation of this comprehensive peripheral vascular program across the institution will warrant the need for more nurse practitioners collaborating with more vascular surgeons in the medical vascular clinic capacity.



### **Summary**

A multidisciplinary team came together to review the current literature and guidelines and to develop a clinical practice guideline for a comprehensive peripheral vascular program. This program is intended to be led by nurse practitioners who coordinate the education and the medical and surgical management of this population.

## Section 5: Dissemination Plan

### **Introduction**

The initial dissemination plan starts with the approval of the appropriate organizational committees. The business plan for the program will be presented to the senior leadership team as a collaborative chronic disease management program similar to the organization's Congestive Heart Failure Program and the Chronic Obstructive Pulmonary Program, and Pediatric Asthma Program. Following approval, the first step will be operationalizing the program and setting up an evaluation plan.

Education programs will be held for area professionals and through professional organization newsletters. Personal visits will be set up with key community referral agents such as independent wound care programs, podiatrists, and endocrinologists who treat diabetes. There will need to be an information technology structure for exchanging patient information across providers.

Should the program prove successful, the plan is to present at the Society for Vascular Nursing as an oral or poster presentation. An article will be submitted to be included in their clinical education resources and their professional journal. Repeat programs in other areas would allow collaboration and potentially this program could be recommended for formal Society for Vascular Nursing Clinical Guidelines. Then the publicized guidelines may be introduced into nurse practitioner programs for the education of future providers.

### **Analysis of Self**

For this project, I began as a new nurse practitioner, a new advanced practice registered nurse to vascular medicine, and a new scholar with the drive and motivation to develop a project where I have the opportunity to make a difference in the quality of care that patients deserve. I used the principles of project management by gathering data and analyzing it, drawing connections between the project information and correlating it to professional experience. Although I am not directly implementing the prototype, I am using the information and knowledge gained to make a difference toward positive social change. The information to care for a vascular patient is available; however, it was not in an organized guide as I have presented here.

I have been able to follow the Doctorate of Nursing Practice Essentials as an advance nurse practitioner given the DNP curriculum and the two components with the creation of this project. This project has met three of these essentials: clinical scholarship, interprofessional collaboration, and clinical prevention and population health.

Clinical scholarship was applied through researching, investigating and synthesizing the evidence, connecting the vascular surgical discipline to clinical practice through comprehensive evaluation, and applying the knowledge through application (AACN, 2020). The interprofessional collaboration remains on-going, working with vascular surgeons, wound care specialists, podiatrists, cardiologists, and subspecialists. I am leading multiple professionals collaboratively for the greatest good of the patient in an efficient and timely manner keeping the focus centered on the patient improving and promoting their health outcomes (AACN, 2020). Thus, my project is designed to promote

population health and improve the overall nation's health with clinical prevention (AACN, 2020). The project places attention on the patient reducing their risks of amputation and mortality by promoting their health with continuity of care through following the established guidelines with routine follow up and education on smoking cessation, hypertension, hyperglycemia, high cholesterol, and the importance of diet, exercise, and routine foot exams.

The project was also associated with specialty competencies and preparation to practice in the area specialty and may be delineated for the specific roles based upon national specialty nursing organizations (AACN, 2020). For myself, I practice in a vascular specialty and am now better prepared to care for the vascular patient. I have further joined the Society for Vascular Nursing which is directly affiliated with Society for Vascular Surgery for a joint membership.

A personal challenge was project management with an interprofessional group. The group participants were all willing and interested, but often had conflicting schedules. In the future, I would consider the use of virtual conferences and google documents for iterative review. The completion of this project has been a grand achievement and I feel that I have made a difference personally, professionally, and socially. The challenges are that vascular knowledge is wide and nurses are under-educated, making vascular medicine understanding and care a struggle. The creation of this project was challenging as it was difficult to find concrete guidance for treating the vascular patient. Communication between the surgeons and other pertinent specialty physicians was limited as they all have varying ways to care for each vascular individual.

There is no comprehensive guide to follow in the clinical setting from one specialist to the next. However, the information is available; the patient needs a good vascular supportive group and a willingness to self-educate. Being able to relate the daily observations and the literature as a new vascular provider to the peripheral vascular disease patient was a challenge at first. With the support from the vascular surgeons and their willingness to educate the other care providers, staff, and patients daily, several of the challenges were minimized. The creation of this clinical practice guideline further supports the proper management of the peripheral vascular disease patient through a comprehensive approach to care and also overcomes most of the challenges.

### **Summary**

Over 2 million lose their limbs a year predominantly from peripheral vascular disease with a high mortality rate within 2 to 5 years (Amputation Coalition, 2019). Developing a prototype for a comprehensive peripheral vascular program is a start to closing the gap in nursing practice, offering nurse practitioners an approach to lead a comprehensive peripheral vascular program. NPs can be pivotal members of the vascular team in caring for this growing population of patients.

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## Appendix A: Appraisal of Guidelines, Research and Evaluation (AGREE) II Domains

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### AGREE Domains

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#### Domain 1 – scope and purpose

1. The overall objective(s) of the guideline is (are) specifically described.
2. The clinical question(s) covered by the guideline is (are) specifically described.
3. The patients to whom the guideline is meant to apply are specifically described.

#### Domain 2 – stakeholder involvement

4. The guideline development group includes individuals from all relevant professional groups.
5. The patients' views and preference have been sought.
6. The target users of the guideline are clearly defined.

#### Domain 3 – rigor of development

7. Systematic methods were used to search for evidence.
8. The criteria for selecting the evidence are clearly described.
9. The strengths and limitations of the body of evidence are clearly described.
10. The methods for formulating the recommendations are clearly described.
11. The health benefits, side effects and risks have been considered in formulating the recommendations.
12. There is an explicit link between the recommendations and the supporting evidence.
13. The guideline has been externally reviewed by experts prior to its publication.
14. A procedure for updating the guideline is provided.

#### Domain 4 – clarity and presentation

15. The recommendations are specific and unambiguous.
16. The different options for management of the condition or health issue are clearly presented.
17. Key recommendations are easily identifiable.

#### Domain 5 – applicability

18. The guideline describes facilitators and barriers to its application.
19. The guideline provides advice and/or tools on how the recommendations can be put into practice.
20. The potential resource implications of applying the recommendations have been considered.
21. The guideline presents monitoring and/or auditing criteria.

#### Domain 6 – editorial independence

22. The views of the funding body have not influenced the content of the guideline.
23. Competing interests of guideline development group members have been recorded and addressed.

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*Note.* From “Appraisal of Guidelines for Research & Evaluation II” by Brouwers et al., 2017, *AGREE Next Steps Consortium*, <https://www.agreetrust.org/>.

## Appendix B: Vascular Specialist Clinical Guide

Nurse Practitioner/Surgeon Approach. Figure B2 is a checklist for these processes.

### **FIRST: Obtain and review along with the physical assessment**

- Vitals: temperature, heart rate, respirations, blood pressure, height and weight
- Social history: smoking (any kind) history and current status
- Medical History: hypertension, high cholesterol or triglycerides, diabetes
- Medications: blood pressure medicines, aspirin (antiplatelet), statin, diabetic medications and over-the-counter medications
- Labs: CBC, BMP, Lipids, HbA1c (in the last 3-6 months)
- Imaging: arterial doppler/ABIs/TBIs (w/or w/out exercise), venous doppler – reflux study

### **SECOND: Analyze results for proper care – may follow up with Vascular Surgeon and/or**

- Order any labs or images, prescribe aspirin and statin
- Refer to PCP for maintenance of medications, referral for cardiologists or endocrinologists
- Discuss smoking cessation – refer to cessation program versus medicinal treatment
- Educate about diet, exercise, healthy weight – possibly gastric surgery referral w/PCP follow up
- Educate about medication compliance and routine PCP visits for care
- Educate on foot care, and lower extremity care what to watch for
- Possibly refer to podiatry, wound care specialist, hematology, rheumatology, lymphedema, cardiology – with PCP follow up given results and patient presentation

### **THIRD: Educate and Follow up**

- Walking regimen, compression stocking, possible one time surgical intervention to fix flow to help heal wound and improve quality of life. Return to walking and living without pain related to circulation issue, which is all dependent on findings of venous versus arterial flow and clinical presentation. Refer to Physical/Occupational Therapy as appropriate.
- Medical vascular patients will follow up in one month, three months, six months, one year, and/or then prn dependent on the individual. For instance if the symptoms are not coordinated with a vascular concern managed directly by vascular specialists the patient would be referred or returned to their PCP sooner than those that are having vascular issues. Venous patients most likely will

require less vascular office visits than those with arterial disease. Prescribed compression stocking, aspirin, and statin refills vascular will maintain until PCP assumes, all other medications and care will be by patients PCP or coordinated through their PCP.

- Further screening should be performed by their PCP such as depression, mentation, routine diabetic foot exams and ongoing lipid panels, HbA1c, blood pressure, diet, exercise, and smoking cessation. Those suffering from tobacco abuse should receive referral to a cessation support group and counselor. PCP should also routinely monitor medication compliance and plan for further financial or social work referrals.
- Patient and family education should correlate with teach back techniques throughout each visit with all providers at every visit every time. Consistency and continuity will guide the vascular patient in the right direction toward limb salvage. This education surrounds diet, walking exercises, monitoring and care for feet, smoking cessation, blood pressure control, blood glucose control, and low cholesterol.

***Disclaimer:*** *Vascular patients will not routinely be prescribed pain medications, they will be referred back to their PCP or a pain specialist. Most times there is conservative management that will help symptoms unless surgery is warranted. Then a one-time opioid prescription may be given if a hospitalized surgical procedure is performed, but refills are not routine either. Often if some extra relief is needed the recommendation will include over-the-counter medicines, as most people are able to return to work without restrictions following their surgical procedure.*

<b><u>Nurse Practitioner Patient Tool</u></b>						
<b>Vitals:</b>	<input type="checkbox"/> Temp	<input type="checkbox"/> HR	<input type="checkbox"/> RR	<input type="checkbox"/> BP	<input type="checkbox"/> height	<input type="checkbox"/> weight
<b>Smoker :</b>	<input type="checkbox"/> History	<input type="checkbox"/> Current	<input type="checkbox"/> Daily	<input type="checkbox"/> > 1 ppd	<input type="checkbox"/> 1 ppd	<input type="checkbox"/> < 1 ppd
<b>Medical Hx:</b>	<input type="checkbox"/> HTN	<input type="checkbox"/> DM	<input type="checkbox"/> CKD	<input type="checkbox"/> atherosclerosis		
	<input type="checkbox"/> MI	<input type="checkbox"/> Stroke	<input type="checkbox"/> high cholesterol/triglycerides			
<b>Medications:</b>	<input type="checkbox"/> BP	<input type="checkbox"/> DM	<input type="checkbox"/> Statin	<input type="checkbox"/> ASA		
	<input type="checkbox"/> other antiplatelet _____			<input type="checkbox"/> OTC _____		
<b>Labs:</b>	<input type="checkbox"/> CBC	<input type="checkbox"/> BMP	<input type="checkbox"/> Lipids	<input type="checkbox"/> HbA1c		
<b>Images:</b>	<input type="checkbox"/> ABI/TBI	<input type="checkbox"/> art. doppler w/exercise		<input type="checkbox"/> art. doppler w/out exercise		
	<input type="checkbox"/> DVT	<input type="checkbox"/> venous reflux		<input type="checkbox"/> CTA	<input type="checkbox"/> other _____	
<b>Education:</b>	<input type="checkbox"/> smoking counseling	<input type="checkbox"/> foot exam	<input type="checkbox"/> home checks	<input type="checkbox"/> Family		
	<input type="checkbox"/> exercise	<input type="checkbox"/> walking regimen	<input type="checkbox"/> diet	<input type="checkbox"/> wound care		
	<input type="checkbox"/> compression hose	<input type="checkbox"/> medication compliance - statin/antiplatelet				
	<input type="checkbox"/> blood glucose monitor	<input type="checkbox"/> blood pressure control	<input type="checkbox"/> Other _____			
<b>Referral:</b>	<input type="checkbox"/> PCP	<input type="checkbox"/> Podiatry	<input type="checkbox"/> Cardiology	<input type="checkbox"/> PT/OT	<input type="checkbox"/> Gastric Sx	
	<input type="checkbox"/> wound care specialty		<input type="checkbox"/> Rheumatology	<input type="checkbox"/> Pain Management		
	<input type="checkbox"/> Lymphedema clinic		<input type="checkbox"/> hematology	<input type="checkbox"/> Other _____		

Figure B2. Nurse practitioner vascular specialty checklist tool.



## Appendix C: AGREE II Rating of Clinical Practice Guidelines Tool

### AGREE II RATING OF CLINICAL PRACTICE GUIDELINES

**Rating Scale: (1) Strongly Agree, (2) Agree, (3) Partially Agree, (4) Neutral, (5) Partially Disagree, (6) Disagree, (7) Strongly Disagree**

Domain	SA	A	PA	N	PD	D	SD
1. The overall objective of the guideline is specifically described	1	2					
2. The health question covered by the guideline is specifically described	1	2					
3. The population to whom the guideline is meant to apply is specifically described	2	1					
4. The guideline development group includes individuals from all the relevant professional groups	2	1					
5. The views and preferences of the target population have been sought	1	2					
6. The target uses of the guidelines are clearly defined	1	2					
7. Systematic methods were used to search for evidence	1	1	1				
8. The criteria for selecting the evidence are clearly described	1	1	1				
9. The strengths and limitations of the body of evidence are clearly described	1	2					
10. The methods for formulating the recommendations are clearly described	1	2					
11. The health benefits, side effects and risks have been considered in formulating the recommendations	2	1					
12. There is an explicit link between the recommendations and the supporting evidence	2	1					
13. The guideline has been externally reviewed by experts prior to its publication	2	1					
14. A procedure for updating the guideline is provided	2	1					
15. The recommendations are specific and unambiguous	2	2					
16. The different options for the management of the condition or health issue are clearly presented	1	2					
17. Key recommendations are easily identifiable	2	1					
18. The guidelines provide advice and/ or tools on how the recommendations can be put into practice	2	1					
19. The guidelines describe facilitators and barriers to its application	1	2					
20. The potential resource implications of applying the recommendations has been considered	1	2					
21. The guidelines present monitoring and/ or auditing criteria	2	1					
22. The views of the funding body have not influenced the content of the guideline	2	1					
23. Competing interests of guideline development group members have been recorded and addressed	2	1					

## Appendix D: Disclosure to Expert Panelist Form for Anonymous Questionnaires

### Disclosure to Expert Panelist Form for Anonymous Questionnaires

*To be given to expert panelist prior to collecting questionnaire responses—note that obtaining a “consent signature” is not appropriate for this type of questionnaire and providing respondents with anonymity is required.*

#### Disclosure to Expert Panelist:

You are invited to take part in an expert panelist questionnaire for the doctoral project that I am conducting.

#### Questionnaire Procedures:

If you agree to take part, I will be asking you to provide your responses anonymously, to help reduce bias and any sort of pressure to respond a certain way. Panelists' questionnaire responses will be analyzed as part of my doctoral project, along with any archival data, reports, and documents that the organization's leadership deems fit to share. If the revisions from the panelists' feedback are extensive, I might repeat the anonymous questionnaire process with the panel of experts again.

#### Voluntary Nature of the Project:

This project is voluntary. If you decide to join the project now, you can still change your mind later.

#### Risks and Benefits of Being in the Project:

Being in this project would not pose any risks beyond those of typical daily professional activities. This project's aim is to provide data and insights to support the organization's success.

#### Privacy:

I might know that you completed a questionnaire but I will not know who provided which responses. Any reports, presentations, or publications related to this study will share general patterns from the data, without sharing the identities of individual respondents or partner organization(s). The questionnaire data will be kept for a period of at least 5 years, as required by my university.

#### Contacts and Questions:

If you want to talk privately about your rights in relation to this project, you can call my university's Advocate via the phone number 612-312-1210. Walden University's ethics approval number for this study is 02-10-20-0523000.

Before you start the questionnaire, please share any questions or concerns you might have.



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