### Using the mid-level provider screener model to decrease door-to-provider time in the emergency department

**Eric Ngonji Njungwe**

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USING THE MID-LEVEL PROVIDER SCREENER MODEL TO DECREASE DOOR-TO-PROVIDER TIME IN THE EMERGENCY DEPARTMENT

by

ERIC NGONJI NJUNGWE, MSN, FNP

A DNP PROJECT

Submitted in partial fulfillment of the requirements for the Degree of Doctor of Nursing Practice to The School of Graduate Studies of The University of Alabama in Huntsville

HUNTSVILLE, ALABAMA
2020
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[Signature]

Student Signature

March 10, 2020
Date
DNP PROJECT APPROVAL FORM

Submitted by Eric Ngonji Njungwe in partial fulfillment of the requirements for the degree of Doctor of Nursing Practice and accepted on behalf of the Faculty of the School of Graduate Studies by the DNP project committee.

We, the undersigned members of the Graduate Faculty of The University of Alabama in Huntsville, certify that we have advised and/or supervised the candidate on the work described in this DNP project. We further certify that we have reviewed the DNP project manuscript and approve it in partial fulfillment of the requirements for the degree of Doctor of Nursing Practice.

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ABSTRACT
The School of Graduate Studies
The University of Alabama in Huntsville

Degree: Doctor of Nursing Practice
College: Nursing

Name of Candidate: Eric Ngonji Njungwe

Title: Using the Mid-Level Provider Screener Model to Decrease Door-to-Provider Time in the Emergency Department

Over the last decade, an increasing number of Americans have been using emergency departments as their main source of healthcare. This has led to a dramatic increase in emergency department utilization rates in the United States. Overcrowding is a direct consequence of increased emergency department utilization. Overcrowding has led to long wait times from patients’ arrival in the emergency department to first contact with the healthcare provider. Long wait times in the emergency department can cause considerable delays in patient care and negatively affect patient satisfaction level. Delays in patient evaluation and treatment in the emergency department also carry certain risks, including potentially devastating health consequences for patients. To address overcrowding and delay in care, hospitals have adopted a combination of strategies including infrastructure improvement to increase emergency department capacity and patient flow methods to streamline emergency department processes for efficiency. This DNP project reviewed data on the use of the mid-level provider screener model as a process efficiency strategy to improve emergency department door-to-provider times at AdventHealth Gordon, formerly Gordon Hospital, in Calhoun, Georgia. The project found the mid-level provider screener model to be an effective strategy in reducing emergency department door-to-provider times by 55%. Through this method, AdventHealth Gordon was able to reduce its average emergency department door-to-provider times from 40 minutes to 18 minutes.

Keywords: door-to-provider time, door-to-doctor time, ED provider screener, ED provider in triage, provider triage screener, emergency department, emergency room.
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Kevin Rodman: Director of the Emergency Department at AdventHealth Gordon. Kevin was my primary resource person at AdventHealth Gordon for this DNP project.
DEDICATION

This DNP project is dedicated to my loving and caring wife, Mrs. Pamela Njungwe and our three children, Jolie Malenjue Njungwe, Eric Ngonge Njungwe, and Anibelle Nsina Njungwe. Their encouragement and support were my motivation to pursue my dreams and finish this project.

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LIST OF ABBREVIATIONS

CMS ................................................................. Centers for Medicare & Medicaid Services

ED ................................................................. Emergency Department

EMR ................................................................. Electronic Medical Record

ESI ................................................................. Emergency Severity Index

DNP ................................................................. Doctor of Nursing Practice

IOM ................................................................. Institute of Medicine

IRB ................................................................. Institutional Review Board

LOS ................................................................. Length of Stay

LWBS ............................................................... Left Without Being Seen

MD/DO ............................................................... Physician

NP ................................................................. Nurse Practitioner

PA ................................................................. Physician Assistant

PLTT ............................................................... Provider Level Triage Team

RN ................................................................. Registered Nurse

SPSS ............................................................... Statistical Package for the Social Sciences

TLP ................................................................. Triage Liaison Providers

UAH ............................................................... University of Alabama in Huntsville

US ................................................................. United States
Using the Mid-Level Provider Screener Model to Decrease Door-to-Provider Time in the Emergency Department

Introduction

Emergency departments (EDs) are required by the Centers for Medicare and Medicaid Services (CMS) to publicly report their throughput metrics (Baker & Esbenshade, 2015; AHRQ, 2014). Throughput in the ED refers to the processes that affect patient flow. ED patient flow includes patient registration, patient triage, room assignment, patient evaluation, diagnostic testing, and patient disposition. One of the throughput metrics that hospitals must report is the Door to Diagnostic Evaluation by a Qualified Medical Professional Time of patients that present to the ED. For purposes of this metric, a Qualified Medical Professional in the ED includes a Physician (MD/DO), a Physician Assistant (PA), and a Nurse Practitioner (NP). Door to diagnostic evaluation time refers to the time of a patient’s first contact in the ED to the time when the patient is seen by a qualified medical personnel for patient evaluation and management (door-to-provider time).

Over the last decade, an increasing number of Americans have been using the emergency department as their main source of healthcare (Pitts, Carrier, Rich, and Kellermann, 2010; Shah, Patel, Rumoro, Hohmann, and Fullam, 2015). One of the main reasons for this upsurge is the fact that emergency departments are increasing the safety net for underserved and uninsured patients (Schuur & Venkatesh, 2012). This has led to a dramatic increase in ED utilization rates and overcrowding in EDs across the United States (Brown, Sullivan, Espinola, & Camargo, 2012; Hsia, 2013). Door-to-provider time suffers when EDs are overcrowded, resulting in delayed patient care, inefficiencies in operations, and inefficiencies in overall institutional performance. EDs across the United States are constantly searching for solutions to address overcrowding as
well as to decrease their door-to-provider times. To decrease its door-to-provider times, AdventHealth Gordon ED implemented a program, hereinafter referred to as the "mid-level provider screener model". In this model, a dedicated mid-level provider (NP or PA) was assigned to stay in the ED triage room, in addition to the regular ED triage Registered Nurse (RN). This process provided patients quick contact with a qualified ED medical personnel and immediate medical evaluation during triage.

**Problem Statement**

The primary purpose of EDs is to address the health emergencies of patients. Over the past two decades, the number of patient visits to EDs in the United States have risen dramatically, leading to significant overcrowding in EDs across the country. According to Erenle et al. (2016), overcrowding in EDs is a major public health problem due to prolonged wait times, delays in patient diagnosis and treatment, delays in the treatment of seriously ill patients, degradation of the quality of care provided, and patients dissatisfaction with their ED experiences. Overcrowding in the ED causes extensive wait times and long door-to-provider times. Long door-to-provider times can cause delays in patient evaluation, delays in diagnosis, and delays in early intervention to optimize health outcomes. When an ED has unusually long door-to-provider times, it creates concerns about patient safety, quality of care rendered, poor patient satisfaction, and the inability to meet the throughput metrics as mandated by CMS. Over the past decade, AdventHealth Gordon ED has experienced a significant increase in its patient volume. To address this problem, the hospital undertook a major renovation of the ED 5 years ago which doubled its capacity of available rooms and patient beds. Despite this infrastructural improvement, the patient volume has continued to increase, leading to overcrowding, long wait times, and long door-to-provider times.
Project Objective

In March 2017, AdventHealth Gordon ED implemented the mid-level provider screener model to decrease its door-to-provider times. The model involves having an NP or PA in triage on the busiest days in the ED and during the busiest times. The busiest days and times were determined by patient volumes to be Sundays, Mondays, and Wednesdays between the hours of 3pm and 11pm. The primary purpose of the mid-level provider screener in triage was to provide patients with quick contact with a qualified ED medical provider. The role of the screening provider in triage was to promptly screen patients as they were triaged by the triage RN, ask additional and relevant medical questions, perform a focused physical exam in triage, initiate diagnostic testing in triage, and order medications in triage as appropriate. Beyond the safety concern of ensuring that patients who presented to the ED were evaluated by a provider in a timely manner, the program also intended to improve quality of care, decrease overall patient length of stay (LOS), decrease the number of left without being seen (LWBS), and improve patient satisfaction.

In June 2019, AdventHealth Gordon ED suspended the mid-level provider screener model due to a temporary drop in patient volume. Since the primary goal of the program was to reduce the ED door-to-provider times, it was anticipated that reduced patient volume would automatically translate to decrease patient wait times in the ED.

This DNP project sought to address measurable outcomes of the AdventHealth Gordon ED mid-level provider screener model with the goal of recommending whether it should be reinstated. In this regard, the main objectives of this quality improvement project were to:

- Review data on the mid-level provider screener model at AdventHealth Gordon ED.
• Evaluate the effectiveness of the mid-level provider screener model as a process efficiency strategy in reducing door-to-provider times at AdventHealth Gordon ED.

• Make an evidence-based recommendation as to whether the mid-level provider screener model should be reinstituted at AdventHealth Gordon ED.

Definition of Terms

The following phrases and terminologies used in this DNP project are defined below:

**ED Wait Time**: Refers to the time from when a patient is registered in the ED to when the patient is first triaged by the ED Triage RN.

**Door-to-Provider Time or Door-to-Doctor Time**: Refer to the time from when a patient is registered in the ED to the time when the patient is first evaluated by an ED medical provider.

**Length of Stay (LOS)**: Refers to the total time from the first documented time after arrival and registration as an ED patient to the time the patient is discharged home from the ED, admitted to the hospital, or transferred to another hospital.

**Left Without Being Seen (LWBS)**: Refers to a patient encounter that ended with the patient leaving the ED before the patient could be seen or evaluated by an ED medical provider.

**Door Time**: Refers to the time when a patient is registered as an ED patient by Registration Service. When a patient is registered in the ED, their chart is automatically time-stamped, and that time can be tracked.

**Provider Time**: Refers to the time when an ED medical provider signs up to see a patient. When providers assign their names to patients, the chart is time-stamped as such and that time can be tracked.

**Discharge Time**: Refers to the time when a patient’s care in the ED has been completed, discharge instructions handed to the patient, and the patient checked out.
PICOT Question

In the emergency department at AdventHealth Gordon, how does the mid-level provider screener model, compared to no screener, affect the door-to-provider time, door-to-discharge time, number of left without being seen, and patient satisfaction level?

Review of Literature

Literature Search

The articles used in this review were obtained by searching electronic databases of peer-reviewed journals from medicine, nursing, and allied health. Databases that were accessed through the University of Alabama in Huntsville (UAH) online Library included the Cumulative Index to Nursing and Allied Health Literature (CINAHL Plus), OVID Nursing Journals, MEDLINE Indexed Journals in PubMed, and ScienceDirect. Each database was searched using the following key phrases, “door-to-doctor time and emergency department”, “door-to-provider time and emergency department”, “door-to-doctor time and emergency room”, “door-to-provider time and emergency room”, “provider screener and emergency department”, provider in triage and emergency department”. To identify only the most relevant articles for inclusion in the literature review, the titles and abstracts of each article from the database searches were reviewed. The inclusion criteria included articles that were research studies on door-to-provider times in the ED or ED wait times; articles that were published in English; articles in peer-review journals; and full text articles published between 2000-2019. Articles that did not satisfy all of the inclusion criteria were excluded from use in this DNP project.

Search Results

The search of the CINAHL database yielded a combined total of 32 articles. After exclusion of duplicate papers, four unique studies were identified as directly relevant for this
The search of OVID generated a combined total of 12 articles. After exclusion of duplicate, four studies were identified for inclusion in the literature review. One of the identified studies had already been retained from the CINAHL search leaving three unique studies from the OVID search. Search of the MEDLINE database yielded a combined total of 15 articles. After exclusion of duplicates, five articles satisfied the inclusion criteria, three of which were previously identified from search of CINAHL and OVID, leaving two unique articles from this search. Search of the ScienceDirect database generated 1646 results. Additional filters were used to make the search results manageable. Results were limited to research studies and only articles in medicine and nursing were selected (allied health articles were excluded in this revised search). Articles also had to have the following search key phrases in their title, “door-to-doctor”, “door-to-provider”, “provider in triage” or “triage screener”. A total of 19 articles were obtained using the revised search, four were determined to satisfy the inclusion criteria, among which three articles were unique to this database search. Table 1 presents the databases and search results.

Table 1

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<tr>
<td>ScienceDirect</td>
<td>19</td>
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The literature review revealed five major strategies that EDs have used to improve on their door-to-provider times. For purposes of this DNP project, these strategies have been titled models. They include the nurse practitioner in triage model, physician in triage model, provider in triage model, telemedicine provider model, and process improvement model. Discussion of the
literature review has been organized based on these models. Some of the studies described in this literature review refer to the Emergency Severity Index (ESI), and it is important to define ESI for ease of comprehension when referred to later. ESI is a five-level ED triage algorithm that clinically stratify patients on the basis of illness acuity and healthcare resource needs with ESI level One (ESI 1) being the most urgent cases with highest acuity, and ESI level 5 (ESI 5) being the least urgent cases with lowest acuity (AHRQ, 2018; González & Soltero, 2009).

**Door-to-Provider Time Improvement Models**

**Nurse Practitioner in Triage Model**

The NP in triage model involved studies that looked at the impact of placing an NP in triage on patient flow and ED wait times. Hayden, Burlingame, Thompson, and Sabol (2014) carried out a study that looked at how patient flow in the ED could be improved by placing an NP in triage. The need for this study was triggered by increasing ED patient volume, long ED wait times, and increasing number of patients that left the ED without a provider evaluation. In this study, an NP was placed in triage during the ED busiest hours to evaluate and initiate orders on all patients triaged at ESI level 3. The study found that having an NP in triage decreased the door-to-provider time from 71.1 minutes before the intervention to 47.9 minutes after the intervention (Hayden et al., 2014).

Tucker and Bernard (2015) performed a study to determine the effect of having an NP in triage. The NP in this study was a “SORT provider” whose role was to obtain a limited focused history in the triage area, perform physical exam, and initiate preliminary diagnostic workup before advancing patients into the fast track or main ED for continuation of care (Tucker & Bernard, 2015). The study found that using a SORT provider substantially improved the door-to-provider time. The average door-to-provider time before the SORT provider was 59.25 minutes
and that decreased to an average of 32.08 minutes after implementation of the SORT provider role (Tucker & Bernard, 2015).

**Physician in Triage Model**

Weston et al. (2017) performed a retrospective cohort study that compared operational performance metrics between triage liaison providers (TLP) and a historical control group without TLP. In this study, TLPs were limited to Senior Resident Physicians and Attending Physicians only. The purpose of having TLPs in the ED was to expedite patient care through the initiation of workup of patients thereby mitigating the consequences of overcrowding by decreasing door-to-provider time, length of stay, left without being seen, and improving patient satisfaction (Weston et al., 2017). The study found that the median door-to-provider time was significantly lower with a TLP (35-39 minutes for TLP days) compared to the historical control (51 minutes for non-TLP days).

Bove et al. (2017) conducted a retrospective observational cohort study to determine the impact of a “Concierge Physician” model on door-to-doctor time and patient flow in an urban ED. The role of the concierge physician was to provide patients with faster physician contact through a brief initial assessment and initiate diagnostic testing and treatment. All available records of ESI level 3 patients during a six-month period with a concierge physician evaluation were reviewed and compared to those without concierge physician evaluation. The study found that patients evaluated by a concierge physician were seen 36 minutes faster, representing a 40% reduction in door-to-doctor time (Bove et al., 2017).

Daniels, Mumma, Morris, and Holmes, J. (2017) carried out a retrospective analysis study to determine the impact of a physician in triage on operational metrics and patient-centered outcomes. Provider in triage consisted of an Attending Physician in triage to evaluate patients
quickly and initiate diagnostic workups. The door-to-provider metrics were assessed by comparing patients evaluated by physician in triage to those not evaluated by physician in triage. The study found that the door-to-doctor time decreased and the left without being seen reduced with implementation of the provider in triage program (Daniels et al., 2017).

**Provider in Triage Model**

Love, Murphy, Lietz, and Jordan (2012) undertook a quality improvement initiative using the “Provider in Triage” model. The provider in triage was either an NP or a PA. In addition to the standard triage nurse, a provider was placed in triage to conduct a medical screening exam and initiate diagnostic testing. The study found a significant decrease in the door-to-provider time from 75 minutes pre-implementation to 25 minutes post-implementation (Love et al., 2012). The study also found that 63% of patients had an initial contact with a provider within 22 minutes post-implementation compared to only 18% pre-implementation (Love et al., 2012).

A study by Shea & Hoyt (2012) looked at the effect of “Rapid Team Triage” on door-to-provider time with a goal to improve the patient ED experience. The Rapid Team Triage model allowed patients to have contact with a provider upon arrival in the ED for a rapid medical assessment and completion of the medical screening examination. The study found that the rapid team triages enabled patients to be seen quicker and the left without being seen rate fell from 4.4% pre-implementation to 1.4% post-implementation.

Barbee, Berry-Cabán, Daymude, Oliver, & Gay (2010) conducted a comparative analysis study on the effect of Provider Level Triage Team (PLTT) in a military facility ED. The PLTT consisted of a PA and a Combat Medic who conducted a quick focused history and physical exam on ESI level 2 and 3 patients. Although this study did not specifically analyze the pre-post door-to-provider times; it found that the time to analgesia decreased from 171.1 minutes to 97.4
minutes; the time to laboratory results decreased from 143.9 minutes to 103.8 minutes; the time to radiology decreased from 181.6 minutes to 136.3 minutes; the time to disposition decreased from 334.6 minutes to 317.4 minutes; and nearly 90% of patients in the intervention group positively rated their experience with the intervention (Barbee et al., 2010).

**Telemedicine Provider Model**

Watson et al. (2010) performed a study to determine the impact of an innovative telemedicine model of physician directed intake (Tele-Intake) on ED metrics compared with a traditional model of an intake physician physically present in the ED. This was a retrospective database review of 13,912 ED visits to a large, urban academic hospital of ESI level 2 and 3 patients. Of the total number of patients in this study, 7,326 patients were evaluated by the traditional in-person physician intake model while 6,586 patients were evaluated by the telemedicine intake model. The study found that the door-to-provider time was significantly reduced with the tele-intake model compared to the traditional physician intake model which were 32 minutes versus 44 minutes respectively (Watson et al., 2010).

Another ED-based telemedicine study looked at the door-to-provider time, ED length-of-stay (LOS), and time-to-transfer to other hospitals (Mohr et al. (2018). The purpose of this study was to measure the impact of ED-based telemedicine on timeliness of care in participating rural hospitals. The primary outcome was door-to-provider time, and secondary outcomes were LOS and time-to-transfer for patients that were transferred to other hospitals. In a total of 127,928 qualifying ED visits, 2,857 consulted telemedicine and were matched with non-telemedicine controls. The study found that in cases where a telemedicine provider was the first to evaluate the patient, patients were evaluated an average of 14.7 minutes earlier than when patients were first evaluated by local providers that were based in-house in the ED (Mohr et al. (2018).
Process Improvement Model

El Sayed, El-Eid, Saliba, Jabbour, & Hitti (2015) conducted a before and after study to determine the effectiveness of using lean management methods to improve process reliability and ED door-to-doctor times. Lean management in healthcare is a set of operating methods, specifically composed of process improvements that help create maximum value for patients by reducing waste and waits, and ultimately create value for organizations and their clients (Lawal et al., 2014). Some of the key interventions implemented in this study included the introduction of a “new patient rack” to improve visibility of new patients to providers; bedside patient registration in parallel to medical evaluation; and direct bedding whereby patients bypass the ED triage process and are placed directly in rooms where an assigned RN assumes patient care. The study found that lean driven interventions were effective process improvement strategies. It led to significant improvements in the mean door-to-doctor times which dropped by 37%, averaging 25.3 minutes post-intervention compared to 40 minutes pre-intervention (El Sayed et al., 2015).

Saiboon et al. (2014) performed a pre-post study to evaluate the effectiveness of the Red Box patient flow system on the door-to-doctor times for patients presenting to the ED. The Red Box was a process improvement and patient flow management system that was implemented in this study. It involved a triage checklist of 14 “red flag” signs and symptoms developed to reduce missed or under triage of emergency patients. The system allowed certain patients, based on their presenting signs and symptoms to be classified as ‘potentially critical’ cases and immediately sent to a specifically designated zone called the Red Box where they were evaluated almost immediately. The study showed a significant decrease in the door-to-provider time. The mean door-to-provider time for the pre-Red Box group was 29 minutes compared to a mean door-to-provider time of 3 minutes for the post-Red Box group (Saiboon et al., 2014).
**Theoretical Framework**

This DNP project adopted the *Quality-Caring Model* as the theoretical framework for improving door-to-provider times in the ED. *Quality-Caring Model* is a middle range nursing theory developed by Joanne Duffy, an endowed nursing professor and nurse theorist. One of her major contributions to the profession of nursing was the development of the *quality-caring model* in 2003, which she continues to develop and enhance for use by nurses in various settings, including clinical practice, education, and research. Since its initiation, the *quality-caring model* has evolved and has been revised twice to address the complexities of modern society and to meet the demands of a multifaceted, interdependent, and global health system (Duffy, 2015). The *quality-caring model* includes the following four main concepts: *humans in relationship, relationship-centered professional encounters, feeling cared for, and self-advancing systems*. The overall purposes of the *quality-caring model* are to guide professional practice, provide a basis for nursing research, guide curriculum development in nursing education, and guide nursing leadership in human interaction and decision-making (Duffy, 2015). The *quality-caring model* is predicated on the notion that the nursing profession should use caring relationships as the basis for daily practice. Caring is the essence of nursing and involves a proactive approach on the part of nurses to establish a welcoming, safe, and trusting environment for patients.

**Application of Theory to ED Care**

The field of health care can be a stressful place to work, and EDs are recognized as particularly stressful environments due to increasing patient volumes, high patient acuity levels, and situations of critical risk for patients (Johnston et al., 2016; Yuguero et al., 2017). EDs are fast-paced environments requiring proper attention, dedication, and focus of health team members to address the varying needs of patients. Because of the busy nature of EDs, quality of
care may suffer without a sense of obligation and caring relationship between health team members and patients. The quality-caring model postulates that when caring relationships are the basis of nursing care, positive human connections are formed with patients and caregivers, and this relationship can positively impact health outcomes (Duffy, 2015). According to Wilkin (2003), nursing is a nurturing profession and the terms care and caring are essential components of holistic nursing practice which are predominantly used to describe the inherent worth and value of nursing. As a core characteristic of nursing, the art of caring must be demonstrated as a foundational belief of all nursing professionals, including those who work in recognized stressful nursing situations like the EDs.

**Application of Theory to DNP Project**

Caring is perceived as human behavior that includes cognitive, affective, psychomotor, and administrative skills within which professional caring may be expressed (Wilkin, 2003). Overcrowding, long wait times, and increased door-to-provider times in the ED all have the potential to cause patient dissatisfaction and a perceived lack of caring among patients and their families. Patients that come to the ED are presumed to have an urgent medical need. While the primary focus of the ED provider is to find out what is medically wrong with patients and treat them accordingly, patients desire to be treated with respect, dignity, and a caring attitude. Consistent with the main concepts of the quality-caring model, patients who come to the ED want to feel treated as unique individuals, have a collaborative treatment relationship with the treatment team, have a sense of security from a feeling of being cared for, and have an understanding of the fact that the system relied upon for care is subject to improvement. Decreasing ED door-to-provider times helps build patients confidence in the health system and feelings of being cared for. When wait times are long, appropriate interventions such as routine
patient updates on ED processes can establish a sense of confidence in patients and foster a perception of genuine concern from the healthcare team.

**Project Implementation**

**Project Site and Population**

This DNP project was conducted in the Emergency Department of AdventHealth Gordon. AdventHealth Gordon is a 69-inpatient bed community hospital located in Calhoun, Georgia. Due to increasing patient volume, the ED was renovated and expanded in 2014 to increase its capacity and it currently has an annual patient volume of 40,000 patients. AdventHealth Gordon is a member of AdventHealth (formerly Adventist Health System) which has its headquarters in the state of Florida. The population in this clinical improvement project are individuals who were registered as patients in the ED during the project sample timeframe.

**Ethical Considerations and Protection of Human Subjects**

This clinical improvement project was carried out with due consideration for ethical principles and standards. It complied with the ethical policies and guidelines of AdventHealth Gordon and the University of Alabama in Huntsville (UAH). Ethical considerations in research are critical because it ensures that the rights of research subjects are respected while safeguarding the integrity of the research. This project involved the review of hospital records without any focus on patients’ medical problems. The records that were retrieved did not have any disclosure of identifiable patient information. The DNP student ensured that all policies related to accessing, printing, photocopying, electronic file transfer, and safe disposal of records were strictly followed. The DNP student is a Nurse Practitioner that works in the Emergency Department in which this quality improvement project was conducted.
Before the DNP project was initiated, several steps were taken to ensure collaboration and to address privacy concerns. First, there was a signed *Student Affiliation Agreement* between AdventHealth and UAH. This agreement detailed the nature of collaboration and responsibilities of the two institutions and the student. Second, the DNP student had to sign the *AdventHealth Privacy and Confidentiality Statement* accepting responsibility for properly managing all information that was obtained as part of this project. Third, the student had to complete the CITI *Program on Research Ethics and Compliance Training*. This program provided an introduction to regulatory and ethical issues important to the conduct of research involving human subjects. Fourth, the student had to go through a rigorous process with the UAH Institutional Review Board (IRB). The purpose of the UAH IRB is to ensure that the rights and welfare of any human research subjects are adequately protected. In the current quality improvement project where human subjects were not recruited, the UAH IRB ensured that processes were in place to adequately guarantee the privacy of patients whose records were accessed and to the security of any information that was retrieved. In the end, this DNP project was conducted with full respect for privacy, anonymity, and confidentiality.

**AdventHealth Gordon ED Workflow**

Patients come to AdventHealth Gordon ED either by walk-in through the ED front entrance or by ambulance through the ED ambulance entrance. Patients that walk-in are registered by registration services and wait in the ED waiting room for triage. Triage is done by an RN and if there is a bed available, the patient is immediately assigned a room. Patients that come to the ED by ambulance generally get assigned a room directly and get registered in the room. However, low acuity patients that come by ambulance may be sent to the front for registration, triage, and bed assignment just like other walk-in patients. After bed assignment, the
evaluation and treatment of all patients in the ED follow the same path. This includes evaluation by a Provider (MD/DO, PA, NP); diagnostic testing; treatment in the ED; and disposition (discharge home, admission to the hospital, or transfer to another hospital).

AdventHealth Gordon ED tracks its throughput metrics for purposes of public reporting as mandated by CMS. As a result, processes are constantly being monitored, data are being collected, and adjustments are made as necessary to improve patient flow in the ED. As part of the process of facilitating patient flow and achieving better throughput metrics, AdventHealth Gordon ED has set the goal for door-to-provider time at 15 minutes and the goal for door-to-discharge time at 120 minutes. Studies have shown that better ED patient flow can lead to decreased ED wait times, decreased patient stay in the ED, improved patient health outcomes, and improved patient satisfaction with services received in the ED (McDonough & Pemberton, 2013; McHugh, Van Dyke, McClelland, & Mess, 2012).

**Project Intervention**

This DNP project involved a retroactive review of data on the use of the *mid-level provider screener model* as a process efficiency strategy to improve ED door-to-provider times at AdventHealth Gordon. This model involved placing a dedicated NP or PA in the ED triage room, in addition to the ED triage RN. The aim of implementing this model was to provide ED patients with quick contact to a qualified ED medical provider and also provide patients with immediate medical evaluation during the triage process. Beyond patient evaluation, the NP or PA in triage could initiate diagnostic testing and order medications for patients in the ED waiting room as appropriate. The intervention in this model was the placement of an NP or PA in triage, and the intended outcome of this intervention was to decrease the time ED patients had to wait before they were seen and evaluated by a medical provider.
Project Timeframe

The data analysis in this DNP project was completed between December 2019 and January 2020 and involved a retroactive chart review during an Intervention Period (time during which the mid-level provider screener model was in effect) and a No-Intervention Period (time during which the mid-level provider screener model was not in effect). As aforementioned, the mid-level provider screener model was introduced at AdventHealth Gordon ED in March 2017 and later suspended in June 2019. For purposes of appropriate comparison, a determination was made to compare data from similar months of the year when the mid-level provider screener model was in effect and when it was not. It was deemed that this comparison will provide the most accurate reflection of the impact of the mid-level provider screener model in the data elements under evaluation. Using the same data period of the year both during the intervention and when there was no intervention was also considered to be significant in minimizing the impact of any seasonal changes in ED patient volume. The selected intervention and no-intervention periods were as noted below:

Intervention Period: August 01, 2018 to August 31, 2018
No-Intervention Period: August 01, 2019 to August 31, 2019

Project Sample

A total of 200 patient records were used for this DNP project. These records were equally divided into 100 records for the intervention period and 100 records for the no-intervention period. Because the mid-level provider screener model was only implemented on Sundays, Mondays, and Wednesdays and specifically between the hours of 3pm-11pm, data collection for the intervention period had to match these criteria for it to be accurate. Convenience sampling strategy was used to obtain patient records. All patients seen on the days/dates and times of
intervention were identified and a convenience sample of 100 patients selected. Data collection for the no-intervention period was based on all patients seen for the month and a convenience sample of 100 patients selected. The sample distributions were done with the intended goal of including patients from each day of the intervention and no-intervention period. Table 2 presents the project sample period.

Table 2

*Project Sample Grouping*

<table>
<thead>
<tr>
<th></th>
<th>Intervention Period (August 1-31, 2018)</th>
<th>No-Intervention Period (August 1-31, 2019)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wed</td>
<td>8/01/2018 3pm – 11pm</td>
<td></td>
</tr>
<tr>
<td>Sun</td>
<td>8/05/2018 3pm – 11pm</td>
<td></td>
</tr>
<tr>
<td>Mon</td>
<td>8/06/2018 3pm – 11pm</td>
<td></td>
</tr>
<tr>
<td>Wed</td>
<td>8/08/2018 3pm – 11pm</td>
<td></td>
</tr>
<tr>
<td>Sun</td>
<td>8/12/2018 3pm – 11pm</td>
<td></td>
</tr>
<tr>
<td>Mon</td>
<td>8/13/2018 3pm – 11pm</td>
<td></td>
</tr>
<tr>
<td>Wed</td>
<td>8/15/2018 3pm – 11pm</td>
<td>All Days of the Month</td>
</tr>
<tr>
<td>Sun</td>
<td>8/19/2018 3pm – 11pm</td>
<td></td>
</tr>
<tr>
<td>Mon</td>
<td>8/20/2018 3pm – 11pm</td>
<td></td>
</tr>
<tr>
<td>Wed</td>
<td>8/22/2018 3pm – 11pm</td>
<td></td>
</tr>
<tr>
<td>Sun</td>
<td>8/26/2018 3pm – 11pm</td>
<td></td>
</tr>
<tr>
<td>Mon</td>
<td>8/27/2018 3pm – 11pm</td>
<td></td>
</tr>
<tr>
<td>Wed</td>
<td>8/29/2018 3pm – 11pm</td>
<td></td>
</tr>
</tbody>
</table>

Only records of patients that were registered, seen, and discharged home from the ED were included in both the intervention and no-intervention samples so that each record obtained would have all the variables being examined for purposes of this DNP project. Excluded from both the intervention and no-intervention samples were patients that were admitted to the hospital, patients transferred to another hospital, psychiatric patients, and patients that left the ED without being seen by a provider. These records were not deemed suitable for analysis in this DNP project because of the absence of one or more data elements under evaluation, because they were not discharged home from the ED.
Sources of Data

AdventHealth Gordon ED uses Cerner FirstNet electronic medical record (EMR) for patient registration and documentation of care provided in the ED. The hospital also uses QlikView Data System, an integration and analytics platform which it has integrated with Cerner FirstNet for purposes of analyzing hospital data. For purposes of this quality improvement project, all records used in the project sample to analyze the door-to-provider and the door-to-discharge times were retrieved from QlikView. Information was also retrieved from Cerner FirstNet related to the patients that left the ED without being seen by a provider. AdventHealth Gordon ED uses Press Ganey surveys to evaluate a wide variety of information related to patients’ satisfaction with ED care, and records were obtained from Press Ganey for this project.

Data Collection

All data for this project was retrieved by the Director of AdventHealth Gordon ED who has access to all the data collection systems used by the ED in tracking and reporting its metrics. Both the DNP student and ED Director were present during the data retrieval process. The hospital record systems interface with excel, and the data were downloaded as excel spreadsheets without the use of any specific data abstraction tool.

The following data were retrieved for this project:

- Sample of 100 patients during the intervention period.
- Sample of 100 patients during the no-intervention period.
- Door-to-provider time for each patient in the sample.
- Door-to-discharge time for each patient in the sample.
- Total patient volume during the intervention period.
- Total patient volume during the no-intervention period.
● Overall patient satisfaction during the intervention period.
● Overall patient satisfaction during the no-intervention period.
● Patient satisfaction with door-to-provider time during the intervention period.
● Patient satisfaction with door-to-provider time during the no-intervention period.
● Total number of LWBS patients during the intervention period.
● Total number of LWBS patients during the no-intervention period.

After data retrieval, the following processes were followed:

● All records in the sample were stripped of patient identifiers, including names, account number, purpose of visit.

● The stripped down versions of all patient records were reassigned a number from 001 to 100 for both the intervention and no-intervention samples.

● The DNP student was only provided the stripped down versions of retrieved records and the ED Director maintained the original version of the records until the end of the project.

Data Analysis

Descriptive analysis was used to present the statistical process in this quality improvement project. Unlike inferential analysis which refers to the statistical testing of theories or hypotheses, descriptive analysis refers to the method of statistically describing the basic elements of data through simple summaries and graphics (Bhattacherjee, 2012). This project also involved the use of comparative analysis and the determination of statistically significant differences. Consistent with social science research, this project adopted a p value of .05, also called a significance (Sig.) value as the cutoff point for statistical significance. A p value that is
less than or equal to .05 \((p \leq .05)\) is considered statistically significant while a \(p\) value that is greater than .05 \((p > .05)\) is considered not statistically significant.

The Statistical Package for the Social Sciences (SPSS) was used to analyze the data and produce the graphs in this project. SPSS is a widely used program for statistical analysis in social sciences, health science, and other disciplines to provide a wide variety of statistical testing and graphical presentations (Ozgur, Kleckner, & Li, 2015; Dembe, Partridge, & Geist, 2011). The following data analyses were conducted in this project:

1. Comparison of the ESI levels of the intervention and no-intervention samples.
2. Comparison of the mean door-to-provider times of the intervention and no-intervention samples.
3. Comparison of the mean door-to-discharge times of the intervention and no-intervention samples.
4. Comparison of the percentage of patients that saw a provider within 15 minutes during the intervention and no-intervention period.
5. Comparison of the percentage of patients that were discharged within 120 minutes during the intervention and no-intervention period.
6. Comparison of patient volumes and the number of left without being seen during the intervention and no-intervention period.
7. Comparison of the number of patient satisfaction survey responses and the level of patient satisfaction during the intervention and no-intervention period.
Results

Data Comparison Based on ESI Levels

The ESI levels of the intervention and no-intervention samples were first presented for visual understanding of the data samples. Table 3 classified the number of patients in the data samples based on the ESI levels.

Table 3

Breakdown of ESI Levels of Data Sample

<table>
<thead>
<tr>
<th>ESI Category</th>
<th>Aug 2018 (No. of Patients)</th>
<th>Aug 2019 (No. of Patients)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ESI Level 1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>ESI Level 2</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>ESI Level 3</td>
<td>47</td>
<td>50</td>
</tr>
<tr>
<td>ESI Level 4</td>
<td>52</td>
<td>48</td>
</tr>
<tr>
<td>ESI Level 5</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>TOTAL PATIENTS</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

In tables 4 and 5, the ESI levels for the intervention and no-intervention samples were compared to determine if there was a statistically significant difference between the data samples. As shown in table 4, the mean ESI level for the intervention sample was 3.46 while the mean ESI level for the no-intervention sample was 3.51. The independent samples t-test performed on the two data samples revealed that there was no statistically significant difference in the ESI levels of intervention and no-intervention samples with $p > .05$ (Sig. = .50) as seen in table 5.

Table 4

Group Statistics of ESI Levels

<table>
<thead>
<tr>
<th>Acuity</th>
<th>Group</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intervention Acuity</td>
<td>100</td>
<td>3.460</td>
<td>.540</td>
<td>.054</td>
<td></td>
</tr>
<tr>
<td>No-Intervention Acuity</td>
<td>100</td>
<td>3.510</td>
<td>.522</td>
<td>.052</td>
<td></td>
</tr>
</tbody>
</table>
Table 5

**Independent Samples T-Test of ESI Levels**

<table>
<thead>
<tr>
<th>Acuity</th>
<th>Levene's Test for Equality of Variances</th>
<th>t-test for Equality of Means</th>
<th>95% Confidence Interval of the Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>F</td>
<td>Sig.</td>
<td>t</td>
</tr>
<tr>
<td>Equal variances assumed</td>
<td>.257</td>
<td>.613</td>
<td>.666</td>
</tr>
<tr>
<td>Equal variances not assumed</td>
<td>.666</td>
<td>197.783</td>
<td>.506</td>
</tr>
</tbody>
</table>

### Comparison of the Mean Door-to-Provider Times

The analyses in tables 6 and 7 were performed to determine if there was a statistically significant difference in the mean door-to-provider times during the intervention period and the no-intervention period. The mean scores in table 6 show that the no-intervention door-to-provider time (M=40.19 minutes; S.D.=32.36) was higher than the intervention door-to-provider time (M=18.94 minutes; S.D.=15.40). The independent samples t-test demonstrates a statistically significant difference in the mean door-to-provider time during the intervention period compared to the mean door-to-provider time during the no-intervention period with \( p < .05 \) (Sig. = .00) as seen in table 7.

Table 6

**Group Statistics of Door-to-Provider Times**

<table>
<thead>
<tr>
<th>Year</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Door-To-Provider</td>
<td>2018</td>
<td>100</td>
<td>18.9422</td>
<td>15.4078</td>
</tr>
<tr>
<td></td>
<td>2019</td>
<td>100</td>
<td>40.1995</td>
<td>32.36300</td>
</tr>
</tbody>
</table>

23
Table 7

Independent Samples T-Test of Door-to-Provider Times

<table>
<thead>
<tr>
<th>Levene's Test for Equality of Variances</th>
<th>t-test for Equality of Means</th>
</tr>
</thead>
<tbody>
<tr>
<td>F</td>
<td>Sig.</td>
</tr>
<tr>
<td>----------------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>Equal variances not assumed</td>
<td>-5.93</td>
</tr>
</tbody>
</table>

Comparison of the Mean Door-to-Discharge Times

The analyses in tables 8 and 9 were performed to determine if there was a statistically significant difference in the mean door-to-discharge times during the intervention period and the no-intervention period. The mean scores in table 8 show that the no-intervention door-to-discharge time (M=162.06 minutes; S.D.=81.70) was higher than the intervention door-to-discharge time (M=136.10 minutes; S.D.=61.85). As shown in table 9, the independent samples t-test demonstrates a statistically significant difference in the mean door-to-discharge time during the intervention period compared to the mean door-to-discharge time during the no-intervention period with \( p < .05 \) (Sig. = .01).

Table 8

Group Statistics of Door-to-Discharge Times

<table>
<thead>
<tr>
<th></th>
<th>Year</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Door-To-Discharge</td>
<td>2018</td>
<td>100</td>
<td>136.1073</td>
<td>61.85499</td>
<td>6.18550</td>
</tr>
<tr>
<td></td>
<td>2019</td>
<td>100</td>
<td>162.0618</td>
<td>81.70149</td>
<td>8.17015</td>
</tr>
</tbody>
</table>
Table 9

Independent Samples T-Test of Door-to-Discharge Times

<table>
<thead>
<tr>
<th></th>
<th>Levene's Test for Equality of Variances</th>
<th>t-test for Equality of Means</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>F</td>
<td>Sig.</td>
</tr>
<tr>
<td>Door To Discharge</td>
<td>Equal variances assumed</td>
<td>7.002</td>
</tr>
<tr>
<td></td>
<td>Equal variances not assumed</td>
<td></td>
</tr>
</tbody>
</table>

Comparison of the Number of Patients Seen Within 15 Minutes

The analyses in tables 10 and 11 were performed to determine if there was a statistically significant difference in the number of patients that were seen by a provider within 15 minutes during the intervention period (2018) and the no-intervention period (2019). As seen in table 10, a total of 50 patients were seen within 15 minutes during the intervention period compared to just 15 patients during the no-intervention period. The independent samples t-test demonstrates that there was a statistically significant difference between the number of patients seen within 15 minutes during the intervention period compared to the number of patients that were seen within 15 minutes during the no-intervention period with \( p < .05 \) (Sig. = .00) as seen in table 11.

Table 10

Group Statistics of Patients Seen Within 15 Minutes

<table>
<thead>
<tr>
<th>Seen within 15 minutes</th>
<th>Year</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2018</td>
<td>50</td>
<td>9.02</td>
<td>.503</td>
<td>.050</td>
</tr>
<tr>
<td></td>
<td>2019</td>
<td>15</td>
<td>11.33</td>
<td>.359</td>
<td>.036</td>
</tr>
</tbody>
</table>
Table 11

Independent Samples T-Test of Patients Seen Within 15 Minutes

<table>
<thead>
<tr>
<th></th>
<th>Levene's Test for Equality of Variances</th>
<th>t-test for Equality of Means</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>F</td>
<td>Sig.</td>
</tr>
<tr>
<td>Seen Within 15 Minutes</td>
<td>Equal variances assumed</td>
<td>95.118</td>
</tr>
<tr>
<td></td>
<td>Equal variances not assumed</td>
<td>-5.668</td>
</tr>
</tbody>
</table>

Percentage of Patients Seen Within 15 Minutes During the Intervention Period

The presentation in this section was done to provide a graphical illustration of how many patients as a percentage of the sample size were seen by an ED provider within 15 minutes during the intervention period. Figure 1 shows that the percentage of patients who saw a provider within 15 minutes during the intervention period was 50%. This means that 50% of patients who came to the ED during the intervention period waited for more than 15 minutes before they were evaluated by a medical provider.
Figure 1

*Percentage of Patients Seen within 15 Minutes during Intervention*

The presentation in this section was done to provide a graphical illustration of how many patients as a percentage of the sample size were seen by an ED provider within 15 minutes during the no-intervention period. Figure 2 shows that the percentage of patients who saw a provider within 15 minutes during the no-intervention period was 15%. This means that 85% of patients who came to the ED during the no-intervention period waited for more than 15 minutes before they were evaluated by a medical provider.
Comparison of the Number of Patients Discharged Within 120 Minutes

The analyses in tables 12 and 13 were performed to determine if there was a statistically significant difference in the number of patients that were discharged from the ED within 120 minutes during the intervention period (2018) and the no-intervention period (2019). As seen in table 12, a total of 52 patients were discharged within 120 minutes during the intervention period compared to just 35 patients during the no-intervention period. As shown in table 13, the independent samples t-test demonstrates that there was a statistically significant difference between the number of patients that were discharged within 120 minutes during the intervention
period compared to the number of patients that were discharged within 120 minutes during the no-intervention period with \( p < .05 \) (Sig. = .01).

**Table 12**

*Group Statistics of Patients Discharged Within 120 Minutes*

<table>
<thead>
<tr>
<th></th>
<th>Year</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seen within 15 minutes</td>
<td>2018</td>
<td>52</td>
<td>89.08</td>
<td>.502</td>
<td>.050</td>
</tr>
<tr>
<td></td>
<td>2019</td>
<td>35</td>
<td>81.75</td>
<td>.479</td>
<td>.048</td>
</tr>
</tbody>
</table>

**Table 13**

*Independent Samples T-Test of Patients Discharged Within 120 Minutes*

<table>
<thead>
<tr>
<th></th>
<th>Levene’s Test for Equality of Variances</th>
<th>t-test for Equality of Means</th>
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<td>Discharged Within 120 Minutes</td>
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**Percentage of Patients Discharged Within 120 Minutes During the Intervention Period**

The presentation in this section was done to provide a graphical illustration of how many patients as a percentage of the sample size were discharged home from within 120 minutes during the intervention period. Figure 3 shows that the percentage of patients who were discharged within 120 minutes during the intervention period was 52%. This means that 48% of patients who came to the ED during the intervention period were in the ED for more than 120 minutes before being discharged.
The presentation in this section was done to provide a graphical illustration of how many patients as a percentage of the sample size were discharged home from within 120 minutes during the no-intervention period. Figure 4 shows that the percentage of patients who were discharged within 120 minutes during the no-intervention period was 35%. This means that 65% of patients who came to the ED during the no-intervention period were in the ED for more than 120 minutes before being discharged.
Figure 4

Percentage of Patients Discharged within 120 Minutes during No-Intervention

Comparison of Patient Volume and the Number of Left Without Being Seen

The presentation in this section was done to demonstrate the number of patients that left without being seen (LWBS) by a provider in the ED during the intervention period (August 2018) and the no-intervention period (August 2019). Figure 5 shows that during the intervention period, the total patient volume was 3065 patients, among which 26 patients (0.8%) left the ED without being seen by a provider. During the no-intervention period, the total patient volume was 3154 patients, among which 52 patients (1.6%) left the ED without being seen by a provider. The data demonstrate that the number of LWBS was higher during the no-intervention period
compared to the intervention period. It doubled from 26 (0.8%) during the intervention period to 52 (1.6%) during the no-intervention period.

**Figure 5**

*Patient Volumes and the number of Left Without Being Seen (LWBS)*

The presentation in this section was done to demonstrate the number of patient satisfaction surveys received (Surveys); the overall patient satisfaction with ED care (Overall Sat); and patient satisfaction specifically related to the door-to-provider time (D-to-P Sat) during the intervention period (August 2018) and the no-intervention period (August 2019). Figure 6 shows that during the intervention period, a total of 60 patient satisfaction survey responses were received with an overall satisfaction with ED care of 86.4%, and a door-to-provider satisfaction of 81.9%. During the no-intervention period, a total of 37 patient satisfaction survey responses were received with an overall satisfaction with ED care of 80.4%, and a door-to-provider satisfaction of 80.4%.
satisfaction of 68.9%. The data demonstrate that the number of patient satisfaction surveys responses received were lower during the no-intervention period compared to the intervention period. Also, overall patient satisfaction with ED care decreased during the no-intervention period compared to the intervention period. In addition, the figures show that patient satisfaction level with the door-to-provider time was lower during the no-intervention period compared to the intervention period.

Figure 6

Patient Surveys and Patient Satisfaction Levels

Discussion of Findings

The primary objective of this DNP project was to review data on the use of the mid-level provider screener model to decrease the door-to-provider times in the ED at AdventHealth Gordon. The data analysis evaluated several outcome elements and the results demonstrated that
the mid-level provider screener model had significant positive impact as a process efficiency strategy at AdventHealth Gordon ED. The various outcome elements that were evaluated and the findings are summarized below for better appreciation.

**Decrease in Door-to-Provider Time**

This project found that the average door-to-provider time was 18 minutes when the mid-level provider screener model was in effect compared to an average of 40 minutes when the mid-level provider screener model was not in effect. Since the door-to-provider time in this case is a reflection of the wait time in the ED, the mid-level provider screener model effectively reduced the ED door-to-provider time as well as the ED wait time at AdventHealth Gordon by a statistically significant 22 minutes or 55%.

**Decrease in Door-to-Discharge Time**

This project found that the average door-to-discharge time was 136 minutes when the mid-level provider screener model was in effect compared to an average of 162 minutes when it was not. Since the door-to-discharge time is a reflection of the overall LOS in the ED, the mid-level provider screener model effectively reduced the ED LOS at AdventHealth Gordon by a statistically significant 26 minutes or 16%.

**Increase in Number of Patients Seen Within 15 Minutes**

The mid-level provider screener model had a positive impact in the percentage of patients seen by a provider within 15 minutes of arrival in the ED which are nationally recommended time frames that have been adopted as the goal of AdventHealth Gordon ED. This project found that during the implementation of the mid-level provider screener model, 50% of the patients that came to the ED were seen by a provider within 15 minutes of arrival, compared to just 15% when the program was not in effect.
Increase in Number of Patients Discharged Within 120 Minutes

During implementation of the mid-level provider screener model, there was an increased percentage of patients discharged within 120 minutes which is also a nationally recommended timeframe and adopted as the goals of AdventHealth Gordon ED. This project found that during the implementation of the mid-level provider screener model, 52% of patients that came to the ED were discharged from the ED within 120 minutes, compared to just 35% when the program was not in effect.

Decrease in Number of Left Without Being Seen

This project demonstrated a correlation between the mid-level provider screener model and the number of patients that left the ED without being seen by a provider. This project found that 52 (1.6%) of patients left the ED without being seen by a provider when the mid-level provider screener model was not in effect, compared to only 26 (0.8%) when the program was in effect. This represents a 100% decrease in the number of LWBS.

Increase in Patients Satisfaction Surveys

This project demonstrated a correlation between the mid-level provider screener model and the number of patient satisfaction surveys received. Only 37 patient satisfaction survey responses were received when the mid-level provider screener model was not under implementation, compared to 60 patient satisfaction survey responses during the implementation of the mid-level provider screener model, representing a 38% increase.

Increase in Patients Satisfaction Levels

This project demonstrated a correlation between the mid-level provider screener model and the overall patient satisfaction with ED care as well as patient satisfaction with ED door-to-provider time. The overall patient satisfaction with ED care was 80.4% when the program was
not in effect, compared to 84.6% during the implementation of the mid-level provider screener model, representing a 5% increase. Also, patient satisfaction with ED door-to-provider time was just 68.9% when the program was not in effect, compared to 81.9% during the implementation of the mid-level provider screener model, representing a 16% increase.

Implications for Clinical Practice

The problem of ED overcrowding has been a struggle for hospitals for a very long time and has become a contemporary issue of high importance to ED and hospital leaders (Bellow & Gillespie, 2014). Overcrowding in EDs across the United States has become so severe that the Institute of Medicine (IOM) called it a national epidemic (IOM, 2007). Overcrowding has a direct correlation to long wait times. Long wait times can have undesirable patient health outcomes (Shen & Lee, 2018). Extensive wait times in the ED can cause considerable delays in patient care and negatively impact patient satisfaction (Horwitz, Green, & Bradley, 2010; Shen & Lee, 2018). To address overcrowding and delay in care, hospitals have adopted a combination of strategies including infrastructure improvement to increase ED capacity, and patient flow methods to streamline ED processes for efficiency.

The primary purpose of this DNP project was to review data on the use of the mid-level provider screener model to improve ED door-to-provider time at AdventHealth Gordon. This project found the mid-level provider screener model to be an effective strategy in reducing ED door-to-provider time by 55%. Through this method, AdventHealth Gordon ED was able to decrease its average ED door-to-provider time from 40 minutes to 18 minutes, which is just 3 minutes over the nationally recommended ED door-to-provider time of 15 minutes. Besides reducing ED door-to-provider time, the mid-level provider screener model also demonstrated a reduction in the overall patient LOS in the ED, decreased the number of patients that LWBS by a
provider in the ED, and increased patient satisfaction levels. These findings have significant implications for clinical practice.

Project Recommendations

Patients that present to the ED desire to be seen and treated promptly. It is also the desire of EDs to address the needs of their patients in a prompt manner. An ED experience that maximizes the quality of care rendered while accomplishing throughput metrics enable hospitals to effectively accomplish their mission of service to their communities while serving patients in a safe, prudent, and timely manner. The findings of this project demonstrate that the mid-level provider screener model was a valuable process improvement strategy for AdventHealth Gordon ED. It is recommended that AdventHealth Gordon ED should reconsider its suspension of the program and restart it because of its positive impact as demonstrated in this quality improvement project. Beyond restarting the program, AdventHealth Gordon ED should also consider implementing the mid-level provider screener model to all days of the week, beyond Sundays, Mondays, and Wednesdays.

Because ED overcrowding, long ED wait times, and long door-to-provider times are problems faced by EDs across the US, hospitals can benefit from the findings of this project by replicating the mid-level provider screener model to decrease their door-to-provider times; decrease their ED wait times; decrease their ED LOS; reduce their number of LWBS, and improve their patient satisfaction levels.

Project Limitations

The main limitation of this project was the use of convenience samples. In order to appropriately examine the impact of the mid-level provider screener model on door-to-provider times, the sample selection had to be suitable for the result to be accurate. Only convenience
sampling could adequately ensure that the intervention sample was truly reflective of the dates and times when the mid-level provider screener program was in effect and that the no-intervention sample was of the same period of the year to minimize the impact of seasonal changes that is seen with ED patient volumes.

Another limitation of this project was the sample size which may be considered small and affect the ability to generalize the study findings. It was determined that a total sample of 200 patients for the intervention and no-intervention periods combined was adequate for purposes of this quality improvement project. The data elements evaluated in this project and the statistical testing performed demonstrate statistically significant findings that support the generalization of the project results.

A third potential limitation of this project is the fact that the DNP student is an employee of AdventHealth Gordon ED where this project was conducted and may insinuate a sense of bias and preemption of study findings. This project was conducted without any preemption of the outcome and bias was minimized in this study by the fact that the project involved retroactive review of patient records. This project utilized records of patient visits that occurred without an active research project in place and no action by patients or ED providers could have been intentionally manipulated to affect the project findings.

**Conclusion**

The result of this quality improvement project is consistent with previously published literature as it demonstrated that placing a mid-level provider in triage decreased the door-to-provider time at AdventHealth Gordon ED. As more patients rely on the ED for their health care needs, EDs are continuously faced with the challenge of overcrowding and long wait times. Hospital and Emergency Department Leaderships are faced with challenges that are not limited
to just clinical practice and the adequacy of staffing levels. They must also be continually focused on quality improvement and data mining in order to be successful in initiating processes that enable their facilities to provide patient centered care and improved customer satisfaction. One of the major focus of EDs across the United States is the search for solutions to help decrease door-to-provider times so that patients can be evaluated and treated within a reasonable time upon arrival in the ED. Long ED wait times have been linked to unsatisfactory patient outcomes. The *mid-level provider screener model* is a solution that hospitals can use to address this problem faced by EDs across the US.

**DNP Project Dissemination Plan**

Through a collaborative effort, the findings of this quality improvement project will be presented through a powerpoint and poster presentation to the leadership and staff of AdventHealth Gordon ED and to the hospital administration as necessary for further dissemination. The DNP project manuscript will also be submitted for consideration for publication in the Advanced Emergency Nursing Journal (AENJ) as another means of disseminating the findings of this project. AENJ is a peer-reviewed nursing journal for advanced practice registered nurses in the field of emergency nursing, and the official journal of the American Academy of Emergency Nurse Practitioners (AAENP). DNP projects are considered to be evidence-based initiatives. Disseminating the findings of evidence-based projects is important for knowledge sharing and education. According to Forsyth, Tracy, Scherb, & Phyllis (2010), it is important to disseminate the findings of evidence-based projects to stakeholders and healthcare professionals so that innovative practices can be applied or replicated in other health care settings. By determining the effectiveness of the mid-level provider screener model, this DNP project has generated knowledge needed for clinical practice improvement.
References


