Reducing COVID-19 Infection Rates in Long-Term Care Facilities Through Education

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April 20, 2021

Notes from the Author

I would like to thank Dr. Jan Tillman for her immense support in this project. The project occurred during the peak of the COVID-19 pandemic outbreak, and without her, this project would not have come to fruition. Additionally, many thanks to my fellow DNP Project Student Team members: Lashonda, Fuzail, Farrah, and Roselyn. Your hard work, dedication, attention to detail, and incredible teamwork have not gone unnoticed and are very much appreciated. It was a pleasure working with all of you. Lastly, a heartfelt thank you to my biggest supporters: Ronnie, Nathan, Cyrille (my mom), Marianelle, Chermaine, Marlene, Sydney, Fuz, Arsel, Linda, and Ron Sr.

The author would like to dedicate this DNP paper and project to her husband, Ronald Hopkins, Jr., her son, Nathan Hopkins, and her mother, Cyrille Schweichler. All the hard work, sacrifices, missed quality time, sleepless nights, and late dinners were all for you. You all are worth it. I love you.

Abstract

The COVID-19 pandemic caused high rates of illness and death among patients and staff in long-term care facilities (LTCF). The DNP project aimed to reduce the impact through education of the Strike Team, a group of skilled health care workers from across North Carolina tasked to aid LTCF functions throughout the pandemic. Education included proper PPE donning and doffing, infection control recommendations, acquiring additional PPE and mandatory reporting of COVID-19 positive cases and deaths. Their training included a virtual return demonstration session with the DNP Project Student Team and concluded with a Qualtrics survey. Strike Team members then trained the LTCF staff on the information learned. There was a 90% completion rate, with 100% of the respondents feeling confident with using PPE correctly after the training, and 100% felt the training improved their knowledge regarding PPE use and infection control. 67% of respondents felt they had enough PPE supplies, and 78% felt they had enough time to correctly use PPE. Limitations included changing knowledge regarding the disease and management thereof, limited and variable data to measure the project's efficacy, and delays in communication and productivity due to lack of direct contact with the project partner. It is recommended to use the most current data in future studies, create a list of contact information to improve communication, and view the educational material to establish baseline knowledge of proper PPE use and infection control.

Keywords: COVID-19, long-term care facility, pandemic, PPE, Strike Team

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Section I

Background

Coronavirus disease 2019 (COVID-19) was known throughout the world in December 2019, originating from Wuhan, China (Centers for Disease Control and Prevention [CDC], 2020b). The World Health Organization (WHO) officially announced COVID-19 as a worldwide pandemic on March 11, 2020 (Kaiser Family Foundation [KFF], 2020). The cause of the disease is the novel SARS-CoV-2, thought to originate from bats, although its exact source is unknown. The virus primarily causes respiratory issues, ranging from mild to severe symptoms (CDC, 2020b; WHO, 2020a). Populations that are mostly affected are the elderly, 65 years and older, and individuals with severe chronic medical conditions involving the heart, kidneys, lungs, or weakened immune systems (CDC, 2020a, 2020b, 2020c; North Carolina Department of Health and Human Services [NCDHHS], 2020b; WHO, 2020a).

Long-term care facilities (LTCF) are at a higher disadvantage (Chidambaram, 2020a). LTCF residents are older, more vulnerable, and tend to have more chronic conditions. Studies show that an increased number of residents, along with a denser population, increases the risk of contracting the disease significantly. In addition to these risks, LTCF are also having issues with staffing shortage and are experiencing deficiencies with infection control with regard to COVID-19. Despite all the efforts being made to limit the transmission of the virus within the facilities, the numbers continue to rise (KFF, 2020).

The Doctor of Nursing Practice (DNP) project partner is spearheading efforts on improving conditions in LTCF in North Carolina (NCDHHS, 2020a, 2020b). They plan to create task force teams, called Strike Teams, to provide streamlined education and follow-up visits in LTCF to help decrease viral transmission and increase staff retention, as well as aid these facilities in maintaining adequate staffing throughout the pandemic (J.Tillman, personal

communication, July 7, 2020). The DNP project is aimed at assisting the project partner in these efforts.

Define the Issue

The continued rise in COVID-19 cases among the LTCF residents and staff are concerning. Some potential causes could be worsening staff shortage, deficient infection control practices, and inadequate supplies of personal protective equipment (PPE) (Hayashi, 2020; Kacik, 2019; True et al., 2020; Weisman, 2020). Long-term care facilities have struggled for years on lack of resources and high turnover rates amongst their staff. Causes of the staff shortage that have been cited include fear of contracting the virus and transmitting the virus to the residents as well as their families, becoming infected with the virus and requiring extended periods of isolation, lower wages compared to the average base pay outside of the field, and lack of resources to conduct their work safely (Chidambaram, 2020a, 2020b; Hayashi, 2020; Kacik, 2019; True et al., 2020). Approximately 11.1% of the United States workforce have been unemployed since February 2020, and 18,000 of these are healthcare workers, with the majority working in long-term care facilities (U.S. Bureau of Labor Statistics, 2020). Inadequate staffing can negatively impact patient care, often leading to inefficiencies and neglect in completing routine tasks (Chidambaram, 2020a, 2020b; Hayashi, 2020; Weisman, 2020).

The CDC, NCDHHS, WHO and the Occupational Safety and Health Administration (OSHA) have provided recommended guidelines for LTCF to follow, along with educational resources to help the facilities implement the changes in order to limit transmission of the virus among the residents and staff in the facilities (CDC, 2020a, 2020b, 2020c, 2020d; NCDHHS, 2020a, 2020b; KFF, 2020; OSHA, 2020; WHO, 2020a, 2020b). However, cases continue to rise among this population despite strict state and federal risk reduction protocols (NCDHHS, 2020b;

True et al., 2020). LTCF comprise 10% of the total positive cases across the United States and 44% of total deaths (KFF, 2020). Approximately 7% of the total positive cases in North Carolina are from LTCF, as well as 52% of total state deaths (KFF, 2020). The data should be taken with caution since the numbers are preliminary and fluctuates constantly, many states and facilities are not required to report their data, and different reporting organizations have variable inclusion and exclusion criteria to formulate their data (NCDHHS, 2020b).

Given the strict protocols implemented among LTCF, including strict visitor restrictions, literature suggests that the virus is carried into facilities by staff and ancillary workers who are necessary in their daily functions (Kacik, 2019). This could be highly related to deficient infection control practices in the facility, which could be potentially resolved with streamlined education among all staff, increase in signage throughout the facilities, and frequent follow-ups on the facilities' progress (Hoban, 2020; J. Tillman, personal communication, July 7, 2020).

Define the Evidence

COVID-19 is a viral infectious disease that can be transmitted by respiratory droplets (CDC, 2020b; NCDHHS, 2020a; WHO, 2020a). The novel SARS-CoV-19 virus, thought to originate from bats that are native to Wuhan, China, are the infectious organism. It can be spread easily through person-to-person contact when coughing, sneezing, standing less than 6 feet or 2 arms length apart, and touching contaminated surfaces without adequate handwashing or disinfecting.

According to the Centers for Medicare and Medicaid Services (CMS), there have been approximately 142,231 COVID-19 positive cases among residents of LTCF across the country, with approximately 38,518 deaths (CMS, 2020). As of July 2020, North Carolina has had 2,508 total cases and 578 total deaths among the LTCF population. As previously discussed, exercise

caution when interpreting presented data, taking into consideration reporting variances among different organizations.

Current recommended guidelines for LTCF in the state level include banning communal activities of groups larger than 10 persons, screening of employees and other personnel prior to entering the facility, frequent screening of residents for COVID-19 symptoms, and requiring use of PPE (Porter, 2020). Visitors remain banned from LTCF until this order is lifted by the governor. Nationally, the CDC recommends that facilities have a designated staff that is specially trained in infection control and prevention who can manage on-site activities related to COVID-19 (CDC, 2020a, 2020d). Facilities are also now required to report their positive COVID-19 cases, staffing information, and supply information weekly to the National Healthcare Safety Network (NHSN) Long-term Care Facility COVID-19 Module. Education of residents, healthcare workers, and visitors on precautions implemented in the facility, including signs and symptoms of COVID-19 are beneficial. Stress and anxiety management can be helpful as well. Staff and residents must always wear a facemask while in the facility, unless they are exempted from this requirement. Individuals exempt from this rule include persons who have difficulty breathing, are unconscious, or unable to remove their mask independently. Cloth facemasks are not recommended for use in place of respirators or facemask. Continue with visitor restrictions as previously mentioned. Ensure that there are enough PPE and infection prevention supplies such as hand hygiene and respiratory hygiene supplies. Facilities are also recommended to have a designated space to monitor and care for COVID-19 positive residents, as well as devise a system to manage new or returning residents whose COVID-19 status is unknown.

Problem Statement

Long-term care facilities in North Carolina continue to experience high rates of COVID-19 infections and staffing shortage.

Purpose Statement

The purpose of the project is to aid the project partner in educating LTCF on the recommended COVID-19 prevention guidelines, allow facilities time to implement the recommended changes, and conduct a follow-up.

Section II. The Action

Define the Intervention(s)

The project partner plans to create a task force, called the Strike Team, that will provide streamlined education to LTCF expressing a need for assistance with decreasing their COVID-19 infection rates (J. Tillman, personal communication, July 7, 2020). The DNP Project Student Team will conduct education sessions on proper infection protocols based on the most recent recommended guidelines with the administration and staff of the LTCF, virtually and face-to-face. They will then conduct site visits with the same LTCF on predetermined timeframes to evaluate their progress. Data recorded will include rates of COVID-19 infection among residents and staff before education, and after site visits. It will also include a gross analysis of the Strike Team members' perception of their knowledge of and preparedness with infection control practices and proper use of PPE. The information will be submitted to the project partner through appropriate mediums and reporting formats.

Ethical Consideration & Protection of Human Subjects

An ethical consideration for the project involves ensuring all staff in all facilities involved receive the same information during education sessions, from frontline workers up to the administrative level. This will ensure uniformity in provided information, aid in understanding, and allow the administrative level a chance to implement appropriate protocols to effect change and protect everybody that enters the facilities, and more importantly, their residents. Education will be provided physically and virtually to reach more of the desired population of administrative staff, nurses, care aides, and other ancillary personnel. There is little potential for target population to be taken advantage of during project implementation. However, caution will be exercised throughout the implementation phase.

In preparation for Institutional Review Board (IRB) approval, the DNP student completed the required Collaborative Institutional Training Initiative (CITI) modules training for Group 2: Social/Behavioral Research Investigators and Key Personnel (CITI Program, 2017). Upon completion of the Qualtrics IRB Tool Survey, it was determined that the project does not require a formal IRB approval process. However, project details will undergo review with the project partner prior to implementation.

Section III. The Project Design

Define the Setting

There are several types of long-term care services in operation throughout the country, and they can be either home-based or facility-based (National Institute on Aging [NIA], 2017a). For the purpose of this project, the focus will be on long-term care services offered in facilities, particularly skilled nursing facilities and assisted living facilities. These facilities are regulated by federal and state governing bodies and ensure compliance through accreditation (CMS, 2021).

Seniors primarily live in these facilities, with majority of the residents being approximately 65 years and older, accounting for 83.5% of residents in nursing homes, and 93.4% of residents in residential care communities (U.S. Department of Health and Human Services [U.S. DHHS], 2019). Majority of the population is comprised of Non-Hispanic white patients, accounting for over 80% of the residents (NIA, 2017a, 2017b). Medicaid is the largest primary payer source for long-term care facilities, accounting for approximately 61.8% of skilled nursing facility payment coverage, assuming coverage after the short-term Medicare coverage ends. Other forms of payment are provided by private insurance, the patients or their families.

Skilled nursing facilities, sometimes called nursing homes, cater to patients that require skilled health care therapy, including nursing, speech, occupational health, and physical therapy (Medicare, n.d.). These facilities are open to patients who have Medicare Part A coverage and have had a qualifying hospital stay, which is at minimum a 3-day inpatient hospital admission. Medicare covers the cost of the patient's stay for a limited time, up to 100 days per benefit period, which begins the first day of inpatient hospital admission, up to 60 days in a row. After the benefit period ends, the patient's status will need to be renewed and they will be required to pay the inpatient hospital deductible. There is no limit to how many times the benefit can be

renewed. Approximately 47.8% of nursing home residents have Alzheimer's or other dementias (U.S. DHHS, 2019).

Assisted living facilities help individuals with daily activities, helping with personal care, medications, laundry, and 24-hour supervision and security (NIA, 2017a, 2017b). Some facilities may provide nursing and medical care, but not all. Their resident census is typically as few as 25 residents or as much as 120. The levels of services available vary by facility and state.

Describe the Project Team

The project team is comprised of the project partner, project partner liaison, DNP project faculty, and the DNP Project Student Team. The project partner operates in both the local and state levels. The project partner liaison serves as the intermediary between the DNP Project Student Team and the project partner. The DNP Project Student Team is comprised of five DNP-level students, in varying stages of their DNP project journey. The DNP Project Student Team will create the educational materials as requested by the project partner. They will also be responsible for disseminating the information and conducting return demonstration sessions with the project participants. The DNP project faculty is composed of two faculty members who will serve as guides and support systems of the DNP Project Student Team and will help facilitate ongoing progress.

Describe the Project Participants

The project participants are the Strike Team members. There are approximately 35 Strike Team members, with 10 of them being employed by the project partner as full-time. For the purpose of the project, the 10 full-time Strike Team members will be considered as the primary project participants. The average age of the participants range from 18 years up to 56 years and older. Majority of them are Emergency Medical Technicians (EMTs), with some being Licensed

Practical Nurses, Registered Nurses, and Paramedics. Most of the project participants have been functioning in their current roles for 0-4 years, with some being in their field for 20 or more years. The project participants will be expected to disseminate the information to other staff in their respective LTCF assignments.

Project Goals and Outcome Measures

Goals and outcome measures have been established in order to gauge the success of this project. The sections below discuss the methods, implementation tools, process measures, outcomes measures, implementation plan, and project timeline.

Description of the Methods and Measurement

The DNP project aims to decrease COVID-19 infection rates in LTCFs. This can be achieved through education of COVID-19 Strike Team members regarding best practice recommendations of infection control practices and available avenues for allocation of necessary resources.

SWOT Analysis. A SWOT analysis allows for the DNP Project Student Team to evaluate internal and external attributes of the project (Moran et al., 2020). This analysis can then be used to guide the direction of the project's focus, building on their strengths and opportunities, and working to improve on their weaknesses and addressing the threats to their success.

The strengths of the project include a two-cohort student team with varying levels of experience. The student team's knowledge base includes long-term care facilities, inpatient and outpatient care settings, and the different avenues' responses to limiting COVID-19 infections. There are also two faculty members that provide support for the student team, with one of them functioning as the liaison between the DNP Project Student Team and the project partner. There

is also a sense of cohesiveness among the team members in completing tasks, as well as an innovativeness and flexibility in adapting and responding quickly to the project partner's requests.

The DNP project is also not without its weaknesses. One of the prominent weaknesses of the project is the lack of communication avenue between the DNP Project Student Team and the project partner. Communication between parties solely relies on the liaison, whose availability may be limited. Additionally, face-to-face contact with the DNP Project Student Team and the project participants is non-existent due to restrictions brought forth by the pandemic. Contact is solely virtual. There is also a lack of access to real-time data needed to determine trajectory and success of the project. Lastly, there is a lack of experience among student team members with conducting a DNP project, which can be improved upon through the support of the two faculty members involved in the project.

Opportunities noted in the project are the need for education among Strike Team members and the use of technology to reach these individuals given the limitation in face-to-face contact. Also, the needs of the project partner changes rapidly, with a short turn-around time for yielding resolutions. This is largely due to the evolving body of knowledge regarding COVID-19 infections and the recommended responses to these changes.

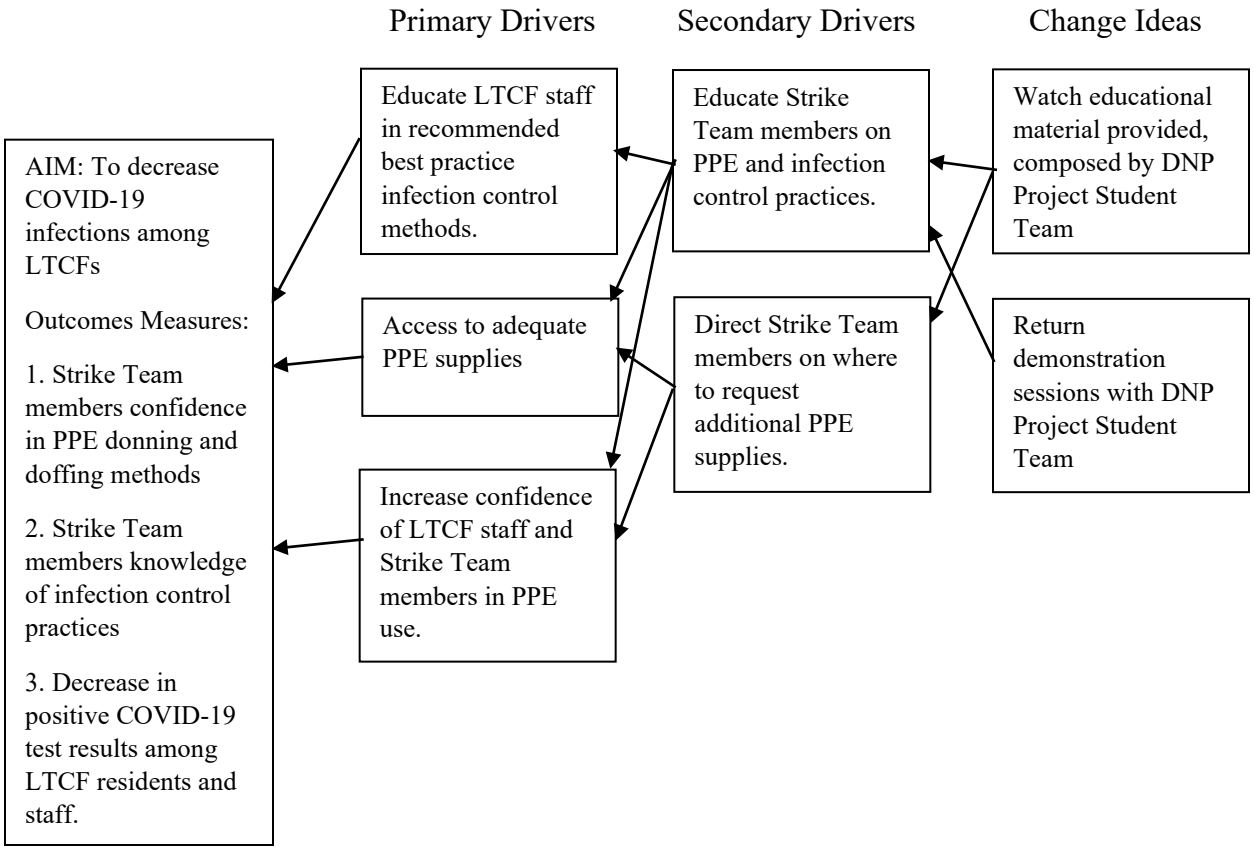
Threats to the DNP project include a very limited time frame to complete return demonstrations with Strike Team members, availability of these members varies greatly from availability of the DNP Project Student Team, and knowledge of technology use varies between Strike Team members and DNP Project Student Team members, potentially limiting their ability to successfully access educational materials and communicate with each other. Additionally, the

project partner provides limited direction with their expectations on the project as well as feedback on the progress.

Driver Diagram.

Figure 1

DNP Project Driver Diagram



Note. This figure succinctly explains the drivers involved in this DNP Project.

Implementation Tools. The Plan-Do-Study-Act cycle is being utilized in the implementation of this project (Institute for Healthcare Improvement, 2020). It serves to allow the DNP Project Student Team to continually evaluate their methods and change accordingly. The project will be accessed as often as needed primarily by the DNP Project Student Team members based on the needs of the project partner, as communicated by the project liaison.

The DNP Project Student Team have decided to meet on a weekly basis during the active implementation phase using the WebEx platform, and as needed using the GroupMe phone application. The DNP Project Student Team will meet with the faculty on a bi-monthly basis, which the dates will be set by the faculty based on theirs and the majority of the student team's availability. Success will be determined based on feedback from the project partner as well as the responses on the Qualtrics survey that the project participants will complete post return demonstration session.

Process Measures. The project is primarily focused on educating the project participants (Strike Team members) in proper PPE donning and doffing methods and infection control practices. The ultimate goal is for the Strike Team members to be able to successfully relay this information to LTCF staff, which will eventually reduce the facilities' COVID-19 infection rates. The process will be measured through a Qualtrics survey that the Strike Team members will complete at the conclusion of the project implementation. Specific drivers in the project include the need to educate Strike Team members and LTCF staff on recommended infection control practices, increasing their confidence in such, and improving their access to adequate PPE supplies. A big barrier for the process is the current restriction imposed by the government with regard to face-to-face contact in LTCF, effectively limiting the DNP Project Student Team's ability to provide better education sessions and establish a concrete working relationship with the Strike Team members and LTCFs. The entire DNP project will need to be done in a completely virtual setting, relying extensively on use of appropriate technology and adequate knowledge of accessing such technology.

Outcomes Measures. Anticipated project outcomes are an increase in confidence among Strike Team members regarding PPE donning and doffing methods and knowledge of infection

control practices, and consequently, an overall decrease in LTCF COVID-19 infection rates. Each outcome will be measured through a Qualtrics survey that the project participants will complete after their return demonstration sessions with the DNP Project Student Team. Data will be collected from the project participants' responses on the survey. Additional data will be obtained from research on numerical trends of the reported LTCF COVID-19 infection rates from reputable sources.

Implementation Plan

The plan is to create an educational material, such as a video presentation, succinctly describing proper PPE donning and doffing methods, best practice recommendations for infection control, and resources to access additional PPE. Then, the DNP Project Student Team will submit the educational material to the project partner via the project liaison, obtain feedback, and edit the material as needed. Thereafter, the project partner will disseminate this information to the Strike Team members (the project participants), who will spend time reviewing the material. They will then be asked to sign up for a return demonstration session with the DNP Project Student Team on preset times in Doodle Poll. The DNP Project Student Team will then conduct the return demonstration session and ask the project participant to complete a Qualtrics survey upon completion of the session. The project participants will earn one hour of continuing education credit for their participation in this training.

Timeline

Table 1

Proposed Project Timeline

Project Phase	Milestone	Estimated Time of Completion
Phase 1: Creation of Educational Material	• DNP Project Student Team will conduct	• One week from date project partner sends

• DNP Project Student Team members will create a video presentation to submit to project partner	extensive research on proper donning and doffing methods, infection control practices and submit to DNP Project Student Team lead (student team lead) for compilation • Student team lead will complete video presentation and send to DNP Project Student Team for review and recording of voice narrative • DNP Project Student Team will return voice narrative to student team lead for review and completion of final edits • DNP Project Student Team will submit the final presentation to faculty liaison, who will then submit to project partner for approval.	request to faculty liaison, DNP Project Student Team will submit research to student team lead • Student team lead will submit completed video presentation within 3 days for DNP Project Student Team to review and record narrative • DNP Project Student Team will have 24-48 hours to record narrative and return to student team lead for review and final edits. • DNP Project Student Team will complete final edits within 24-48 hours of receipt of narrative recording, and submit final product to faculty liaison. • Faculty liaison will send final presentation to Project partner for approval
Phase 2: Education of Project Participants	• Project participants will review video presentation. • Project participants will schedule a return demonstration with DNP Project Student Team. • DNP Project Student Team will create a Doodle Poll for scheduling of return demonstration sessions based on	• Project participants will have one week to review video presentation and sign up for a return demonstration with DNP Project Student Team. • 24-48 hours for DNP Project Student Team to create a Doodle Poll and make this available for project participants to access.

	DNP Project Student Team availability.	
Phase 3: Return Demonstration and Successful Completion	• Project participants will receive a WebEx meeting link for their scheduled return demonstration sessions. • Project participants will attend the scheduled return demonstration session. • Project participants will complete the Qualtrics survey after the return demonstration session. • Project participants will receive a Certificate of Completion after completion of the survey.	• Within 24 hours, DNP Project Student Team will send a WebEx meeting link to the project participant based on the date/time they signed up for in Doodle Poll • Within 1 week of submission of video presentation to project partner, DNP Project Student Team will create a Qualtrics survey with an active link to send to the project participants post-return demonstration. This will also include a Certificate of Completion at the end of the survey. • DNP Project Student Team will send the link to the Qualtrics survey after the project participant successfully completes their return demonstration session. • Return demonstrations will span 4-5 weeks, based on the needs of the project partner and project participants
Phase 4: Data Collection	• DNP Project Student Team will collate data from Qualtrics survey once all return	• One to two weeks after completion of all return demonstration sessions, DNP Project

	demonstration sessions have completed. • DNP Project Student Team will collate data trends from reputable sources regarding COVID-19 infection rates among LTCFs	Student Team will collate data from Qualtrics survey and compile information into an Excel spreadsheet. • Over the course of one to two months after implementation, DNP Project Student Team will monitor trends in LTCF COVID-19 infection rates and collect the data accordingly.

Note. This is a projected timeline of the DNP Project implementation. Information contained herein depends largely on the project partner's needs and the availability of the DNP Project Student Team and the project participants.

Section IV. Results and Findings

Results

The primary goal was to mitigate the spread of COVID-19 in long-term care facilities (LTCFs) through education of the Strike Team members regarding infection control practices and proper use of personal protective equipment (PPE). It evolved into measuring the Strike Team's perception of the training's effectiveness in increasing their confidence and knowledge in such matters. The expected long-term outcome continues to be a significant decrease in LTCF infection rates. Data was measured based on the survey responses at the end of the return demonstration session. Completion of the survey indicated that the respondent had viewed the presentation and completed a 50-minute return demonstration session with a DNP Project Student Team member.

The decrease in overall infection rates in LTCFs were originally expected as results for the project. As discussed above, the goal evolved into educating all 35 Strike Team members (N = 35) who will be deployed to these facilities and disseminate the information they have learned from the project. A minimum of 50% of the Strike Team was expected to participate and complete the survey, which was at least 18 people (n = 18).

Actual results did not meet the expected initial minimum number of participants (n=18) as the site champion confirmed that there are only 10 full-time Strike Team members, which would bring the expected number of participants from N = 35 to N = 10. The other 25 team members are part-time volunteers. The full-time staff members would be expected to disseminate the information to the part-time team members and staff at LTCFs. Nine out of the 10 full-time Strike Team members have completed the education and survey, indicating a 90% completion rate.

Outcomes Data

The survey included 10 questions, consisting of nominal and ordinal options in the answer choices, see Appendix A. The questions were mostly demographic, with a few intended to gauge the participant's knowledge and confidence level of PPE use. These items include the participant's age range, current professional role, length of time functioning in current licensure or certification, and their highest education level. Other information includes: the participant's perception of the effectiveness of the virtual education in improving their knowledge on PPE, confidence in PPE donning and doffing procedures, availability of PPE and ability to locate them in their facilities, whether or not they have enough time to include proper donning and doffing of PPE in their workload, and any other information they would like to share in a comment box to be used for qualitative data.

Process measures include increasing knowledge on proper PPE use and decreasing infection risk, specifically through proper handwashing and sanitation. Outcome measures for the project involve ultimately reducing the rates of COVID-19 infection in LTCFs. However, the project could potentially extend to more than one year of ongoing work. Therefore, during the initial stages, the primary focus is on process measures.

Discussion of Major Findings

The gap between the initial expected results and the actual results occurred from counting the entire Strike Team census (N = 35) as the population, not explicitly defining our population to include only the full time Strike Team members (N = 10). Once this was known and defined, the actual results of the process measures were an overall success.

As illustrated in Appendix B, the responses were measured using a 3-point Likert Scale based on the Strike Team member's level of agreement to the following statements:

- I have had plenty of personal protective equipment at the facilities where I have staffed; and
- I have always been able to locate personal protective equipment at the facilities where I have staffed.

Based on these statements, 67% or 6 out of 9 respondents reported that they had plenty of PPE at their facilities, while 22% or 2 out of 9 respondents felt they did not have enough supplies. Approximately 4 out of 9 (56%) of the respondents reported they knew where the supplies are stored, and three respondents reported that they did have difficulty locating PPE at their facilities.

Other valuable data obtained, not represented in Appendix B, include 78% of the respondents felt that they had enough time to use PPE correctly, while 11% reported they did not have enough time to use PPE correctly. 100% of respondents expressing that the virtual education improved their knowledge regarding PPE use, as well as 100% expressed increased confidence in donning and doffing of PPE after in-service education.

Section V. Interpretation and Implications

Cost-Benefit Analysis

There is no exact number about the project's cost since this information is not readily available through extensive literature review. However, the project would likely cost the organization thousands of dollars in people, time, money and other resources, as this project may run over two years, if not more. For example, the average cost of a single Strike Team ambulance for a 7-day deployment consisting of 4 team members is approximately $12,366 (North Carolina Office of Emergency Medical Services, 2014). The cost of training at least 10 full-time Strike Team members may not be that high initially but may eventually come up to that over time. This cost would include reviewing a 10-minute project video presentation, signing up for a Doodle Poll return demonstration session, attending the live return demonstration session that takes approximately 30-40 minutes, and responding to the survey at the end of the session. Upon completing the survey, the participant will receive a certificate of completion that awards them one hour of continuing education credit. Additionally, the cost would include PPE supplies and wages to cover the time for the hours rendered in services at their assigned LTCFs.

Appendix C illustrates a proposed budget of the project in greater detail. Based on this proposal, it would cost approximately $735.00 to cover the cost of the materials for the PPE return demonstration session for the 10 Strike Team members and five DNP Project Student Team members who will be actively involved in this phase of the project, which would be an average of $49.00 per person. It would cost approximately $652.55 to completely train one Strike Team member. This includes completion of the 16-hour CMS training, one hour for completion of DNP project training, cost of continuing education (CEU) credit, and PPE supplies, as mentioned above. To train the 10 full-time Strike Team members, it would

potentially cost the project partner $6,5255.00. This does not involve the time that each of the 10 full-time Strike Team members will take to train the 25 part-time members, as well as the LTCF staff. The average cost of a hospital stay for COVID-19 treatment for patients over 60 years old without insurance or whose insurance coverage is out-of-network is approximately $78,569 (Hackett, 2020). For uninsured patients over 60 years old who require hospitalization for one to five days, the average cost is around $40,204. If their stay was extended to six to 10 days, the cost increased to $89,874, with costs jumping significantly if they stayed greater than 10 days, amounting to approximately $460,989 at the very least.

The cost of hospitalization for an older adult, who are the typical patients in a LTCF setting, is significantly higher than the cost of training Strike Team members on proper PPE use and best practice recommendations for infection control prevention. The project would bring streamlined education to the Strike Team members, which they can further disseminate to their peers, staff, and facilities. There are variances in PPE donning and doffing procedures, as well as infection control practices from different government organizations. The streamlined education will create less redundancy and overload of information for all parties involved. Additionally, this will boost the team's confidence in their work, improve efficiency and quality of care, and eventually decrease infection rates and deaths in LTCFs over time.

Unexpected negatives are currently unknown, since the project is in its initial stages. There is not enough information and data to determine any specific positives or negatives for the project. However, several appointments were cancelled by Strike Team members. This created a loss of time for DNP Project Student Team members who allotted the time frame to accommodate the Strike Team member. Additionally, the lack of attendance and loss of time led

to delays in preparation and, ultimately, limited the timeliness of the Strike Team's response to the outbreaks in LTCFs.

At this stage of the projected multi-year project, it is too early to determine whether the organization had a good return on their investment. However, it is projected that these early interventions will create a cascade of positive events over the long-term, such as increased testing, reduction in infection rates, and improved staffing retention rates. Future iterations of the project can study the project's return on investment in greater detail.

Resource Management

The organization has several resources at their disposal to increase the likelihood of successful outcomes. The creation of the Strike Team was made possible through the Coronavirus Aid, Relief, and Economic Security (CARES) Act, which was a $2 trillion economic relief aid signed into law on March 27, 2020 (Moss et al., 2020). Approximately $242.4 billion of the funds were allocated for health and health-related activities. This includes support for the COVID-19 Strike Team, COVID testing, development of vaccination, research, and many others to combat COVID-19. The project partner has several healthcare agencies and resources, and their jurisdiction is far-reaching that they can reach out to local health departments and LTCFs across the state. This ability helps the project effectively reach the target population. The structure of the program that the project partner has created with the Strike Team allows for these 10 full-time team members to become superusers and cascade their training to appropriate personnel and provide real-time education to LTCF staff. The project partner also has helpful information stored on their website specific to LTCFs, which can be a quick reference for this population based on their current needs (NCDHHS, n.d.-c).

Knowledge regarding the virulence of COVID-19, its transmission, course of illness, clinical presentation, and effects on susceptible populations were minimal at the beginning of the project. This knowledge, along with minimal testing capabilities, prevented an impactful response to mitigating the virus's spread in LTCFs. However, this knowledge continues to grow and evolve, and could undoubtedly impact the future course of action of the project partner and the resources they may employ. Appendix D discusses developments with management of COVID-19, along with most current data post-project implementation.

It is uncertain whether the organization has resources that could have been used but were not used at this stage. Suppose the organization does have resources that they could re-allocate. In that case, they could add it to training more full-time Strike Team members and supporting other programs that contribute to the long-term goal of decreasing COVID-19 infection rates among LTCFs.

Implications of the Findings

Implications for Patients

The Strike Team members will have streamlined knowledge and increased confidence in implementing strategies to reduce COVID-19 infection transmission in LTCFs. The patients will indirectly benefit from having systems in place that protects them from potentially contracting the disease.

Implications for Nursing Practice

There will be improvement in nursing practice among LTCFs after receiving streamlined education on proper PPE use and infection control practices from the Strike Team members. This will consequently improve their confidence in functioning in their roles. Nursing’s increased

confidence in their roles, in addition to system support, can further influence improved staffing retention.

Impact for Healthcare System(s)

The project partner, as well as the LTCFs, will become better prepared to handle future outbreaks, given the knowledge gleaned from initial and current COVID-19 responses and increased knowledge about the virus.

Sustainability

The organization has expressed that insight gained from this project not only helps them with improving processes in LTCFs, but it can also be used for responding to future outbreaks. The organization should be able to afford to continue the project, depending on continued funding from their largest benefactors.

- The organization has been awarded approximately $1.6 billion from federal and state benefactors for diverse COVID-19 response programs (NCDHHS, n.d.-a).
- LTCFs have a projected $877,183,837 share of the $1.6 billion budget for the fiscal year 2020-2021 (NCDHHS, n.d.-a).

If funding from the largest benefactors is no longer available, the project partner will be unable to continue employing Strike Team members. If the project partner no longer employs Strike Team members to staff LTCFs, there is no need to continue with this project. However, the number of infections and deaths continue to rise, especially among long-term care facilities. Utilization of stronger strategies can help with better outcomes, such as development of vaccines against COVID-19, constant surveillance of COVID-19 variants in relation to disease prognosis and severity, and more successful treatment measures. More information regarding these

strategies, as well as other developments in the management of COVID-19 are discussed in Appendix D.

Dissemination Plan

Dissemination of findings will include:

- East Carolina University College of Nursing – A formal presentation, including a project poster presentation will be conducted in April 2021 to conclude this student's participation in the project. Findings from the project will be shared with colleagues, mentors, professors, and other stakeholders during this presentation.
- Sharing of information gleaned from the project with the project partner and stakeholders through their preferred platform, i.e., paper, email, or presentation. Information will be provided continuously through the project site champion until conclusion of the student's participation in the project.
- Submission of final project paper and poster to The Scholarship, East Carolina University's online repository, which will be available for the general public to review at their leisure.
- Presentation of project findings at the annual Rural Health Symposium, either virtually or in person, depending on how they are conducting it that year, based on availability and approval from their governing body to participate in the program.

Section VI. Conclusion

Limitations

Barriers encountered in the planning and implementation phases stem from the project's fluid and complex nature. The novelty of the illness and its effects on the population and its systems prevented the project partner and the team to create proactive plans to prevent adverse outcomes. The lack of direct communication with the project partner also posed challenges with developing timely plans. Often, directives were given by the project partner through the site champion, and responses were needed as soon as possible. Turn-around times for creating solutions and educational materials were short, but flexible. The lack of an effective communication system also prevented the DNP Project Student Team from following-up on the Strike Team members. The DNP Project Student Team did not have any contact information of Strike Team members, including full- and part-time members. This essential information could have resulted in increased participation, and consequently increased data gathered.

A significant project limitation is the lack of access to data and ability to measure desired outcomes related to COVID-19 infection rates and staffing retention rates in LTCFs pre- and post-project implementation. This access would have allowed the DNP Project Student Team to determine whether the interventions were significant and evaluate methods for improvement.

Recommendations for Others

- Planning: The student recommends that future project participants will need to consider current evidence related to COVID-19, including its virulence, course of illness, clinical presentation, effects on susceptible populations, transmission, infection rates especially in LTCFs, proper PPE use, patient and staff testing, standards and process of reporting cases, and requesting supplies and staffing from appropriate sources.

- Implementation: We recommend that future project participants consider watching the presentation created by the DNP Project Student Team and learn how to properly perform donning and doffing of PPE. They should also educate themselves on infection control strategies. These will assist them to successfully train future Strike Team members and others LTCF staff so they may do the same in their assigned facilities. Additionally, future project participants should continue to require Strike Team members and other interested participants to complete the survey so they may be able to track their data and assess for improvement. Questions may be altered based on current recommendations in managing COVID-19 in LTCFs. Completing the survey will also allow Strike Team members to provide proof of completion using the certificate provided after their responses.
- Evaluation: Future project participants may use data gathered from the survey to help determine effectiveness of the educational material among the Strike Team members. Additionally, revised or new surveys covering more current COVID-19 concerns among LTCFs may be used, such as COVID-19 treatment modalities, long-term effects of the disease, and access to COVID-19 vaccinations. Data gathered from these may be analyzed to support initial findings of this project.

Recommendations for Further Study

- Construction of a communication tree with contact information of Strike Team participants may help ensure effective dissemination of information. Contact information must be kept confidential.

- Obtain information regarding costs related to LTCFs in the treatment of COVID-19 and management of long-term effects of the virus among the patient population. This information may prove beneficial in justifying need for continuity of the project.
- Obtain data on infection rates among LTCFs staff and patients, staffing retention rates, and staff confidence in caring for patients/residents in LTCFs, preferably pre- and post-project implementation. If focusing on all these categories at once may prove to be a gargantuan undertaking, it may help to divide the project into smaller projects focusing on one of the categories mentioned above for each smaller project.

In conclusion, COVID-19 has upended the delicate status of LTCFs. There have been too many lives lost to this pandemic, particularly among the older population. However, as new developments are made, and better management strategies are implemented, there is hope that these numbers will improve over time. With the advent of COVID-19 vaccinations and programs being created to deliver these vaccinations to the most vulnerable in the population as quickly as possible, along with consistent compliance with the 3 W's of infection prevention: wearing face mask, washing hands frequently, and waiting 6 feet apart from others, more lives can and will be saved. The completion of this project satisfies the American Association of Colleges of Nursing DNP Essentials as listed in Appendix E.

References

Biologix Solutions. (2021). *North carolina nursing CEUs: North carolina board of nursing approved continuing education*. Retrieved April 6, 2021, from https://blxtraining.com/north-carolina-nursing/#:~:text=North%20Carolina%20Nursing%20CEUs%20%2D%2030%20CEUs%20for%20only%20%2439.99

Brothers, W. (2020, December 3). *A timeline of COVID-19 vaccine development*. Biospace. https://www.biospace.com/article/a-timeline-of-covid-19-vaccine-development/

Carlsen, A., Huang, P., Levitt, Z., & Wood, D. (2021, April 6). *How is the COVID-19 vaccination campaign going in your state?*. Shots: Health News from NPR. Retrieved April 7, 2021, from https://www.npr.org/sections/health-shots/2021/01/28/960901166/how-is-the-covid-19-vaccination-campaign-going-in-your-state

Centers for Disease Control and Prevention. (2020a, May 28). *Clinical staff information*. Nursing homes and assisted living (Long-term care facilities [LTCFs]). https://www.cdc.gov/longtermcare/staff/index.html

Centers for Disease Control and Prevention. (2020b, June 16). *About COVID-19.* Coronavirus Disease 2019 (COVID-19). https://www.cdc.gov/coronavirus/2019-ncov/cdcresponse/about-COVID-19.html

Centers for Disease Control and Prevention. (2020c, June 25). *Older adults*. Coronavirus Disease 2019 (COVID-19). https://www.cdc.gov/coronavirus/2019-ncov/need-extra-precautions/older-

adults.html#:~:text=Among%20adults%2C%20the%20risk,they%20may%20even%20die.

Centers for Disease Control and Prevention. (2020d, June 25). *Preparing for COVID-19 in nursing homes*. Coronavirus Disease 2019 (COVID-19). https://www.cdc.gov/coronavirus/2019-ncov/hcp/long-term-care.html

Centers for Medicare and Medicaid Services. (2020, July 12). *COVID-19 nursing home data*. Data.CMS.gov. https://data.cms.gov/stories/s/COVID-19-Nursing-Home-Data/bkwz-xpvg/

Centers for Medicare and Medicaid Services. (2021, February 5). *Nursing homes*. Quality, Safety & Oversight- Guidance to Laws & Regulations. https://www.cms.gov/Medicare/Provider-Enrollment-and-Certification/GuidanceforLawsAndRegulations/Nursing-Homes

Chidambaram, P. (2020a, March 13). *Data note: How might coronavirus affect residents in nursing facilities?*. Coronavirus (COVID-19). https://www.kff.org/medicaid/issue-brief/data-note-how-might-coronavirus-affect-residents-in-nursing-facilities/

Chidambaram, P., Garfield, R., & Neuman, T. (2020b, November 25). *COVID-19 has claimed the lives of 100,000 long-term care residents and staff*. Coronavirus (COVID-19). https://www.kff.org/policy-watch/covid-19-has-claimed-the-lives-of-100000-long-term-care-residents-and-staff/

CITI Program. (2017). *Group 2: Social/Behavioral research investigators and key personnel*. Institutional Courses. https://www.citiprogram.org/members/index.cfm?pageID=50

Hackett, M. (2020, November 5). *Average cost of hospital care for COVID-19 ranges from $51,000 to $78,000, based on age*. Healthcare Finance. Retrieved April 6, 2021 from

https://www.healthcarefinancenews.com/news/average-cost-hospital-care-covid-19-ranges-51000-78000-based-age#:~:text=In%20July%2C%20the%20report%20showed,23%20to%2030%20age%20bracket.

Hayashi, Y. (2020, March 6). Nursing homes brace for coronavirus outbreak amid staffing concerns; Facility managers worry infection could worsen staff shortages if their workers are quarantined. *Wall Street Journal*. Retrieved July 23, 2020, from https://search.proquest.com/docview/2375554592?pq-origsite=summon&accountid=10639

Hoban, R. (2020, June 18). *Cohen to lawmakers: Prevention will curb COVID backslide*. North Carolina Health News. https://www.northcarolinahealthnews.org/2020/06/18/cohen-to-lawmakers-prevention-best-defense-against-covid-case-backslide-in-n-c/

Institute for Healthcare Improvement. (2020). *Plan-do-study-act (PDSA) worksheet*. Tools. http://www.ihi.org/resources/Pages/Tools/PlanDoStudyActWorksheet.aspx

Kacik, A. (2019, July 1). *Nursing home staffing levels often fall below CMS expectations.* Modern Healthcare. https://www.modernhealthcare.com/providers/nursing-home-staffing-levels-often-fall-below-cms-expectations

Kaiser Family Foundation. (2020, July 24). *State data and policy actions to address COVID-19*. Coronavirus (COVID-19). https://www.kff.org/health-costs/issue-brief/state-data-and-policy-actions-to-address-coronavirus/?utm_source=web&utm_medium=trending&utm_campaign=covid-19

Medicare. (n.d.). *Skilled nursing facility (SNF) care.* Medicare.gov. Retrieved April 5, 2021, from https://www.medicare.gov/coverage/skilled-nursing-facility-snf-care

Moran, K., Burson, R., & Conrad, D. (2020). *The doctor of nursing practice project: A framework for success.* Jones & Bartlett Learning.

Moss, K., Wexler, A., Dawson, L., Long, M., Kates, J., Cubanski, J., . . . Pollitz, K. (2020, April 9). *The coronavirus aid, relief, and economic security act: Summary of key health provisions*. Kaiser Family Foundation. Retrieved April 5, 2021 from https://www.kff.org/global-health-policy/issue-brief/the-coronavirus-aid-relief-and-economic-security-act-summary-of-key-health-provisions/?gclid=CjwKCAjw6qqDBhB-EiwACBs6x8o6mb6BhCR-M5KvZ3M9T4-1OYP3L3_ziDkj6GBI9qHEiaRIBt4flRoCKoIQAvD_BwE

National Institute on Aging. (2017a, May 1). *Residential facilities, assisted living, and nursing homes*. Long-term Care. https://www.nia.nih.gov/health/residential-facilities-assisted-living-and-nursing-homes

National Institute on Aging. (2017b, May 1). *What is long-term care?* Long-Term Care. https://www.nia.nih.gov/health/what-long-term-care

North Carolina Department of Health and Human Services. (n.d.-a). *County budget estimates*. DSS Budget Estimates. https://www.ncdhhs.gov/divisions/social-services/county-staff-information/budget-information/dss-budget-estimates

North Carolina Department of Health and Human Services. (n.d.-b). *Frequently asked questions about COVID-19 vaccinations*. Vaccines. Retrieved April 7, 2021 from https://covid19.ncdhhs.gov/vaccines/frequently-asked-questions-about-covid-19-vaccinations#for-how-long-will-the-vaccine-protect-me-against-covid-19

North Carolina Department of Health and Human Services. (n.d.-c). *Long-term care facilities*. COVID-19 Response. https://covid19.ncdhhs.gov/information/health-care/long-term-care-facilities

North Carolina Department of Health and Human Services. (2020a). *NCDHHS' COVID-19 response*. NCDHHS COVID-19 Response. https://covid19.ncdhhs.gov/

North Carolina Department of Health and Human Services. (2020b, July 24). *COVID-19 ongoing outbreaks in congregate living settings: Updated july 24, 2020*. Additional Data Sources: Summary. https://files.nc.gov/covid/documents/dashboard/Weekly-COVID19-Ongoing-Outbreaks.pdf

North Carolina Office of Emergency Medical Services. (2014). *North carolina ambulance strike team mission plan.* https://metrolinapreparedness.org/wp-content/uploads/2019/11/North-Carolina-Ambulance-Strike-Team-Mission-Plan-Version-1-FINAL.pdf

Occupational Safety and Health Administration. (2020). *COVID-19 guidance for nursing home and long-term care facility workers*. OSHA Alert. https://www.osha.gov/Publications/OSHA4025.pdf

Porter, F. (2020, April 9). *Governor cooper signs order to tighten social distancing measures, strengthen long-term care rules and streamline unemployment benefits process*. NC Governor Roy Cooper. https://governor.nc.gov/news/governor-cooper-signs-order-tighten-social-distancing-measures-strengthen-long-term-care-rules

Saplakoglu, Y. (2020, December 14). *1st dose of COVID-19 vaccine given in New York*. LiveScience. https://www.livescience.com/first-doses-coronavirus-vaccine-america-new-york.html

The Atlantic Monthly Group. (2021). *The long-term care covid tracker*. The COVID Tracking Project. Retrieved April 1, 2021 from https://covidtracking.com/nursing-homes-long-term-care-facilities

True, S., Cubanski, J., Garfield, R., Rae, M., Claxton, G., Chidambaram, P., & Orgera, K. (2020, April 23). *COVID-19 and workers at risk: Examining the long-term care workforce*. Coronavirus (COVID-19). https://www.kff.org/coronavirus-covid-19/issue-brief/covid-19-and-workers-at-risk-examining-the-long-term-care-workforce/

U.S. Bureau of Labor Statistics. (2020, June). *Employment situation summary*. Economic News Release. https://www.bls.gov/news.release/empsit.nr0.htm

U.S. Bureau of Labor Statistics. (2021, March 31). *May 2020 state occupational employment and wage estimates: North Carolina*. Occupational Employment and Wage Statistics Retrieved April 6, 2021 from https://www.bls.gov/oes/current/oes_nc.htm#29-0000

U.S. Department of Health and Human Services. (2019, February). *Long-term care providers and service users in the United States, 2015-2016: Analytical and epidemiological studies*. Vital and Health Statistics. https://www.cdc.gov/nchs/data/series/sr_03/sr03_43-508.pdf

Weisman, R. (2020, March 10). Nursing homes fear coronavirus could aggravate severe staff shortages. *Boston Globe*. Retrieved July 23, 2020 from https://search.proquest.com/docview/2375554592?pq-origsite=summon&accountid=10639

World Health Organization. (2020a). *Coronavirus*. https://www.who.int/health-topics/coronavirus#tab=tab_1

World Health Organization. (2020b, June 29). *Listing of WHO's response to COVID-19*. News. https://www.who.int/news/item/29-06-2020-covidtimeline

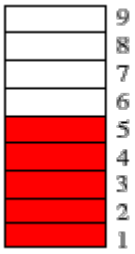
Appendix A

Qualtrics Survey

1. Select the age range that best fits you.
   - ○ 18 to 25 years old
   - ○ 26 to 35 years old
   - ○ 36 to 45 years old
   - ○ 46 to 55 years old
   - ○ 56 years old+
   - ○ Prefer not to answer
2. What is your current professional role?
   - ○ Administrative Staff (including Shift Supervisor, Nurse Manager, or Administrative Assistant)
   - ○ Certified Nursing Assistant
   - ○ EMT
   - ○ Licensed Practical Nurse
   - ○ Paramedic
   - ○ Registered Nurse
   - ○ Other [ ]
3. How long have you had your current licensure or certification?
   - ○ 0 to 4 years
   - ○ 5 to 9 years
   - ○ 10 to 14 years
   - ○ 15 to 19 years
   - ○ 20 or more years
4. What is your highest level of education completed? Choose the option that best fits you.
   - ○ GED
   - ○ High School Diploma
   - ○ Some College
   - ○ Technical Degree or Certification
   - ○ Associate degree
   - ○ Bachelor's Degree
   - ○ Graduate Degree
5. The virtual education I received improved my knowledge about putting on and taking off personal protective equipment (PPE)?
   - ○ Strongly agree
   - ○ Somewhat agree
   - ○ Neither agree nor disagree

- ○ Somewhat disagree
- ○ Strongly disagree

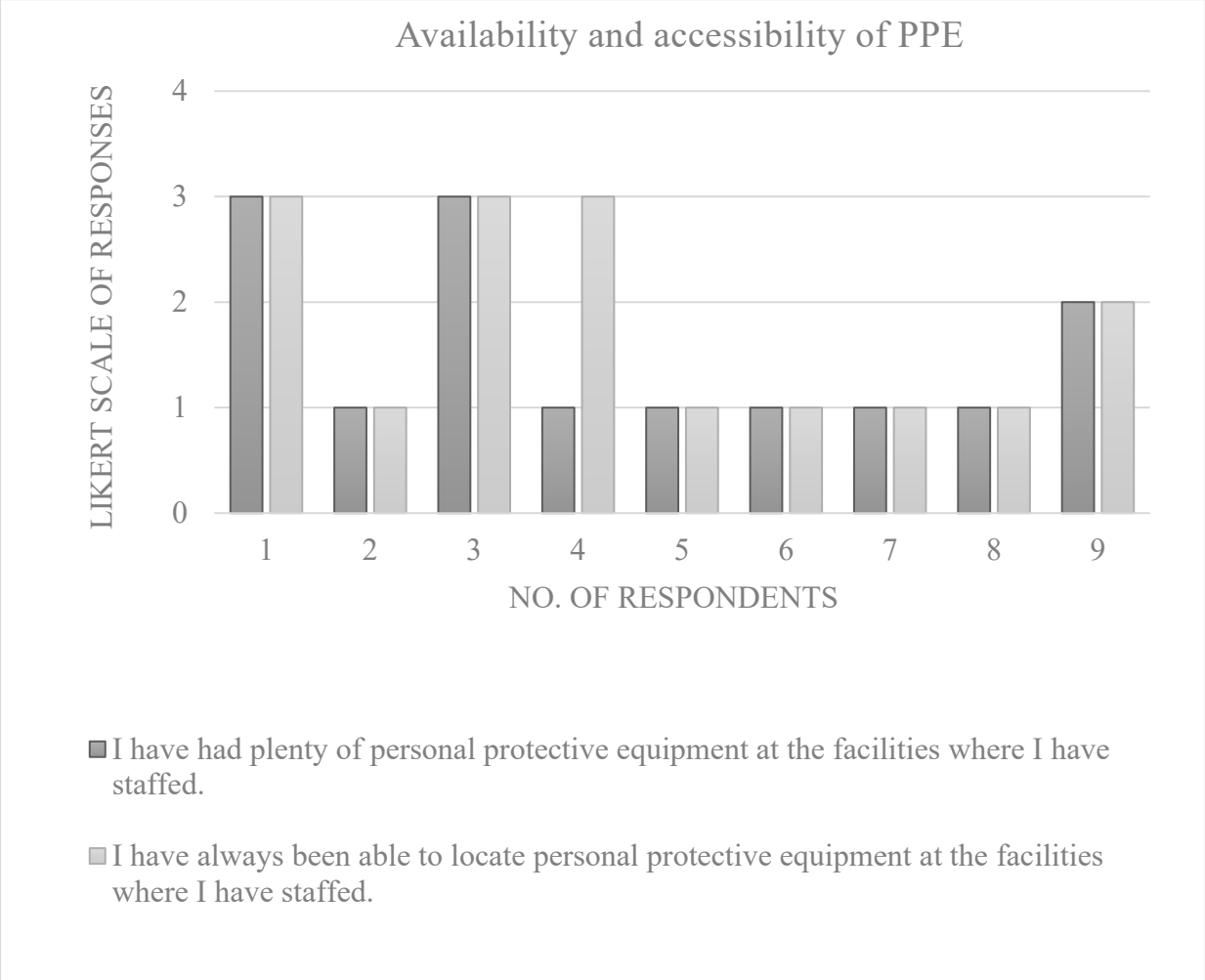
6. On a scale of one to nine, after the in-service how confident are you that in putting on and taking off personal protective equipment (PPE)? (1- not confident and 9- very confident)



7. I have had plenty of personal protective equipment at the facilities where I have staffed.
   - ○ Yes
   - ○ Uncertain
   - ○ No
8. I have always been able to locate personal protective equipment at the facilities where I have staffed.
   - ○ Yes
   - ○ Uncertain
   - ○ No
9. I feel like I have time in my schedule to correctly use personal protective equipment.
   - ○ Strongly agree
   - ○ Somewhat agree
   - ○ Neither agree nor disagree
   - ○ Somewhat disagree
   - ○ Strongly disagree
10. What other information would you like to share?

Appendix B

Availability and Accessibility of Personal Protective Equipment (PPE)



Note: This figure illustrates the Strike Team members' perception on availability of ample PPE and their ability to locate PPE in their assigned facilities.

Appendix C

Proposed Budget

Line Item	Unit Cost	Quantity	Total
Virtual PPE Check-off Return Demonstration Materials[1]			
• **Box of gloves (100-count)**	$25.00	15[2]	$375.00
• **N-95 mask (per mask)**	$2.00	15	$30.00
• **PPE Gown (pack of 10)**	$15.00	15	$225.00
• **Face shield (pack of 2)**	$7.00	15	$105.00
Total	**$49.00**		**$735.00**
COVID-19 Strike Team Member Training[3]			
• **Review of CMS module**	$33.15[4]	16	$530.40
• **1-hour return demonstration[5]**	$33.15	1	$33.15
• **1-hour CEU credit[6]**	$40.00	1	$40.00
• **PPE supplies[7]**	$49.00	1	$49.00
Total	**$155.30**		**$652.55**

Note: Proposed budget for training of Strike Team members.

[1] Cost of PPE check-off return demonstration materials, including box of gloves, N-95 mask, PPE gown, and face shield based on most current Amazon.com prices (as of 4/7/2021).

[2] Quantity includes the 10 full-time Strike Team members and the five DNP Project Student Team members.

[3] Cost of COVID-19 Strike Team member training is based on training of one Strike Team member.

[4] Cost is based on 2020 average salary of a Registered Nurse (U.S. Bureau of Labor Statistics, 2021)

[5] One-hour return demonstration includes review of educational video, approximately 45 minutes for return demonstration session and completion of Qualtrics survey of one Strike Team member based on average salary of a Registered Nurse (U.S. Bureau of Labor Statistics, 2021).

[6] Refers to the one hour of continuing education units (CEU) credit obtained after awarding of certificate of completion at the conclusion of the required training. Cost is based on average cost of CEU (Biologix Solutions, 2021)

[7] Refers to the per unit cost of PPE supplies discussed in previous section of this table.

Appendix D

Post-Implementation Developments

Project implementation concluded in December 2020. Many developments have occurred since the conclusion of the project implementation. New discoveries have been made, and management of COVID-19 has improved. LTCF facility deaths account for 44% of overall deaths in North Carolina (The Atlantic Monthly Group, 2021). Although, this percentage does not seem to show much improvement since the beginning of the pandemic. There is improvement in data reporting and collection from governing bodies, such as the CDC and NCDHHS. It is possible that this percentage does not accurately reflect the change due to the lack of mandatory reporting and inconsistencies in data collection at the beginning of the pandemic. North Carolina started requiring mandatory reporting of LTCF COVID-19 positive cases and deaths in Winter 2020 (WHO, 2020b).

The development of the COVID-19 vaccinations marked a time of hope for the end of the pandemic, or at the very least easing of restrictions and return to normal life (Brothers, 2020). On March 30, 2020, “Operation Warp Speed” was created to fund expedited research and development of the COVID-19 vaccine. A process that would normally take 10-15 years to determine safety and efficacy, as well as obtain Food and Drug Administration (FDA) approval was significantly shortened for the COVID-19 vaccine. The first dose of the vaccine was given on December 14, 2020 (Saplakoglu, 2020). Since then, approximately 62.4 million people or 18.8% of the U.S. population have been fully vaccinated (Carlsen et al., 2021). North Carolina has fully vaccinated 18.2% of the population so far, with 21.1% of the 10.4 million people living in the state having received at least the partial dose. Approximately 3.3 million doses are being

administered each day, which gives hope that if the trajectory continues, by September 6, 2021, approximately 85% of the population in the U.S. will have been fully vaccinated.

There are still unknown factors to consider with regard to achieving herd immunity and the need for additional doses (NCDHHS, n.d.-b). It is not known how long protection of the vaccine will last, and exactly how many people will need to be vaccinated to achieve herd immunity. There are variants to the virus that have emerged since the inception of the vaccine, and it is unclear how effective the current COVID-19 vaccines are against these variants, although the latest findings show some degree of protection. Guidelines are still in place and continue to be strongly recommended for individuals to follow, including those that have been fully vaccinated. The federal government continues to recommend maintaing social distancing, wearing face covering, and frequent handwashing until COVID-19 cases and deaths have reached a significant decline.

Appendix E

DNP Essentials Mapping

	Description	Demonstration of Knowledge
Essential I ***Scientific Underpinning for Practice***	**Competency** – Analyzes and uses information to develop practice **Competency** -Integrates knowledge from humanities and science into context of nursing **Competency** -Translates research to improve practice **Competency** -Integrates research, theory, and practice to develop new approaches toward improved practice and outcomes	• Conducted research about COVID-19 and its impact on LTCF at the beginning of the pandemic • Conducted research on Strike Team members and its function in relation to mitigating spread of COVID-19 • Conducted research on improvements with COVID-19 mitigation efforts post-project implementation, including vaccination development and distribution
Essential II ***Organizational & Systems Leadership for Quality Improvement & Systems Thinking***	**Competency** –Develops and evaluates practice based on science and integrates policy and humanities **Competency** –Assumes and ensures accountability for quality care and patient safety **Competency** -Demonstrates critical and reflective thinking **Competency** -Advocates for improved quality, access, and cost of health care; monitors costs and budgets **Competency** -Develops and implements innovations incorporating principles of change **Competency** - Effectively communicates practice knowledge in writing and orally to improve quality **Competency** - Develops and evaluates strategies to manage ethical dilemmas in patient care and within health care delivery systems	• Conducted research on COVID-19 data in LTCF infection rates and deaths pre-implementation • Created return demonstration session appointments on Doodle Poll. Once Strike Team members signed up, they were sent a WebEx link for their session. • Developed Qualtrics survey to evaluate efficacy of project in improving Strike Team confidence in PPE use and infection control
Essential III ***Clinical Scholarship & Analytical Methods for***	**Competency** - Critically analyzes literature to determine best practices **Competency** - Implements evaluation processes to measure process and patient outcomes	• Use of information technology such as GroupMe app, email, and text/call to communicate with DNP

Evidence-Based Practice	**Competency** - Designs and implements quality improvement strategies to promote safety, efficiency, and equitable quality care for patients **Competency** - Applies knowledge to develop practice guidelines **Competency** - Uses informatics to identify, analyze, and predict best practice and patient outcomes **Competency** - Collaborate in research and disseminate findings	project team to communicate research findings • Along with the DNP Project Student Team, developed an education video for Strike Team members to use in their infection control training • Submission of training video to project partner, who disseminated the information to the Strike Team members • Development of Qualtrics survey to gauge efficacy of project
Essential IV ***Information Systems – Technology & Patient Care Technology for the Improvement & Transformation of Health Care***	**Competency** - Design/select and utilize software to analyze practice and consumer information systems that can improve the delivery & quality of care **Competency** - Analyze and operationalize patient care technologies **Competency** - Evaluate technology regarding ethics, efficiency and accuracy **Competency** - Evaluates systems of care using health information technologies	• Created Qualtrics survey for Strike Team members to complete, provided certificate of completion to Strike Team members after completion of return demonstration sessions and Qualtrics survey • Use of PowerPoint program to create education video for project partner • Use of GroupMe, Microsoft Outlook email, WebEx, Doodle Poll, phone call, and text messaging to communicate with DNP Project Student Team, DNP faculty, project liaison, project partner, and Strike Team members
	Description	**Demonstration of Knowledge**
Essential V ***Health Care Policy of Advocacy in Health Care***	**Competency**- Analyzes health policy from the perspective of patients, nursing and other stakeholders **Competency** – Provides leadership in developing and implementing health policy **Competency** –Influences policymakers, formally and informally, in local and global settings	• Completed CITI module 2; applied for IRB approval prior to project implementation; determined that IRB approval was not necessary for completion of this project

	Competency – Educates stakeholders regarding policy **Competency** – Advocates for nursing within the policy arena **Competency**- Participates in policy agendas that assist with finance, regulation and health care delivery **Competency** – Advocates for equitable and ethical health care	• Reviewed current state mandates regarding COVID-19 mitigation efforts. • Considered government and CDC recommendations in dissemination plan; concluded that dissemination of information with Strike Team members will be 100% virtual due to COVID-19 restrictions • Incorporated current state guidelines and recommendations in educational video so this information can be disseminated to Strike Team members and LTCF staff
Essential VI ***Interprofessional Collaboration for Improving Patient & Population Health Outcomes***	**Competency**- Uses effective collaboration and communication to develop and implement practice, policy, standards of care, and scholarship **Competency** – Provide leadership to interprofessional care teams **Competency** – Consult intraprofessionally and interprofessionally to develop systems of care in complex settings	• Collaborated with project partner, DNP faculty, and DNP Project Student Team to create educational video for Strike Team members, establish and complete return demonstration sessions, collect data using Qualtrics survey, and interpret findings • Managed DNP Project Student Team in development of educational video to ensure timely completion • Use of communication modalities such as GroupMe, WebEx, email, phone calls and text messaging to communicate with DNP Project Student Team, DNP faculty, project liaison, and Strike Team members for their return demonstration sessions (WebEx and email only)
Essential VII ***Clinical Prevention &***	**Competency**- Integrates epidemiology, biostatistics, and data to facilitate individual and population health care delivery	• Created educational video containing COVID-19 background information, PPE

Population Health for Improving the Nation's Health	**Competency** – Synthesizes information & cultural competency to develop & use health promotion/disease prevention strategies to address gaps in care **Competency** – Evaluates and implements change strategies of models of health care delivery to improve quality and address diversity	donning and doffing procedures, infection control strategies, and resources for Strike Team and LTCF facilities to use to obtain PPE, report positive COVID-19 cases and deaths, and other workforce support • Created DNP Poster to aid in dissemination of project findings • Presentation of DNP Poster in DNP Poster Presentation day, along with most recent COVID-19 data for LTCF rates of infection and deaths
Essential VIII ***Advanced Nursing Practice***	**Competency**- Melds diversity & cultural sensitivity to conduct systematic assessment of health parameters in varied settings **Competency** – Design, implement & evaluate nursing interventions to promote quality **Competency** – Develop & maintain patient relationships **Competency** –Demonstrate advanced clinical judgment and systematic thoughts to improve patient outcomes **Competency** – Mentor and support fellow nurses **Competency**- Provide support for individuals and systems experiencing change and transitions **Competency** –Use systems analysis to evaluate practice efficiency, care delivery, fiscal responsibility, ethical responsibility, and quality outcomes measures	• Collaborated as a team of five DNP students of varying cohorts and two DNP faculty • Weekly meetings with DNP Project Student Team at the peak of the project implementation phase to discuss developments in the project • Bi-weekly meetings with student team and faculty to update on progress and project partner needs • Released log-in information of information technology tools, such as email, WebEx, and Doodle Poll to the remaining DNP Project Student Team cohort that were created for the purpose of the project • Developed cost-benefit analysis of project to demonstrate financial significance of project • Review of peers' papers, DNP posters, and poster presentations and provided feedback for improvement