

**Effectiveness of Education on the Use of a Functional
Capacity Tool in Corrections**

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Dedication and Acknowledgments

This quality improvement (QI) project is the culmination of nearly 30 years of work as a healthcare provider and a scientist. I became inspired to become a nurse by my mother, who became a nurse in the 1950's, when assessment of blood pressure was outside the scope of nursing practice. This project is dedicated to her memory.

This project would not be possible without the support of my life partner, Lisa Harden. She is not a nurse, but she is a staunch advocate for those who are involved with the criminal justice system. I would also like to acknowledge my first nursing mentor throughout the 1990's, Pauline Desjarlais, CRRN, RN, MSN who encouraged me to become board certified as a rehabilitation nurse and continue my education as far as I could. I also acknowledge all my other mentors in nursing, including but not limited to Dr. Ernest Grant, Dr. Russell "Gene" Tranbarger, Dr. Edward Hallorhan, Dr. Donald Kautz, Dr. Kristen Mauk, Dr. Barbara Lutz, Dr. Donna Patterson-Jernigan, Dr. Patricia Quigley, Dr. Jill Rye, and Dr. Ann Smith. Finally, I acknowledge my mentors in correctional healthcare, including but not limited to Dr. Deborah Shelton, Dr. Annette Maruca, Dr. Donna Zucker, Dr. Louise Reagan, Dr. Patricia Blair, Mary Muse, Susan Smith, Katie Wingate, Heather Norman, and Captain Timothy Thomas.

"If I have seen further it is by standing on the shoulders of Giants."

- Sir Isaac Newton, 1675

Abstract

Background: There is little to no education provided about how to use an assessment tool used in determining the functional capacity of an incarcerated person in the State Prison system of North Carolina. This assessment, vital to determining the individual needs, is also used to initiate a plan of care, particularly those with chronic or acute illnesses.

Purpose: The aim of this quality improvement project was to develop, implement, and evaluate an educational program designed to assist the medical providers within the state of North Carolina Prison System in the administration of a functional capacity tool known as PULHEAT.

Methods: A quantitative analysis using a retrospective chart review was used to collect pre- and post-intervention data to determine whether a statistical significant change in medical providers' utilization of the tool occurred. The secondary outcome of the project aspires to provide the highest quality medical care to ensure that each patient seen in the North Carolina State Prison System achieves the maximum functional capacity possible, and that this function, measured objectively, improves over time.

Results: The mean of the scores in the pre-intervention assessment were significantly lower than the mean of the scores in the post-intervention assessment. Thus, fulfilling the primary outcome of this project.

Recommendations and Conclusion: The educational program is expected to be implemented system-wide and made a mandatory annual training. Further research to test the tool is the next logical step, to determine the validity and reliability of the tool itself.

Keywords: correctional healthcare; quality improvement; functional assessment; functional capacity tool; education; patient assessment; medical duty status; patient acuity; correctional medicine; correctional healthcare; correctional nursing; performance improvement.

Effectiveness of Education on the Use of a Functional Capacity Tool in Corrections

In the United States, chronic disease management accounts for most healthcare expenditures, with the prison system being no exception (De Smet et al., 2017). During the admission process, the medical provider applies a tool known as PULHEAT to determine an incarcerated person's overall functional capacity. This tool assists in determining which type of housing and which facility would be best to assign the incarcerated person. PULHEAT is an acronym that stands for: Physical stamina, Upper extremities, Lower extremities, Hearing (ears), Eyes (vision), Activity grade, and Transportation needs. Each category is assigned a number of one through five; a higher number indicates decreased function and/or increased needs in that functional area. Dental status, mental health status, and retardation [sic], added to PULHEAT, are the purview of Dentists and Licensed Mental Health Professionals, respectively (NCDPS, 2014).

In the prison system of North Carolina, there is little to no training for medical providers in the use of the functional capacity tool, PULHEAT. The current method of evaluation of the use of the tool is to ask the provider if he or she knows how to use the tool (Woglom, 2021). PULHEAT and Medical Duty Status (MDS) may be the two most important areas of assessment in the patient's record, because they help determine where a patient is housed and for what job assignment they are assigned and/or eligible. The evaluation and recording of the individual's medical and physical status plays an important role in determining the outcomes of the patient. Without an accurate assessment, a patient's assigned housing unit and job assignment can bring about poor outcomes. By working or going to school, patients are given "gain time" which reduces their sentence length. Additionally, an accurate PULHEAT ensures housing the patient in an appropriate area and they are allowed to have certain items in their property, such as a

brace, wheelchair, or crutches. In the absence of an accurate, up-to-date PULHEAT, prisons' administration must rely on other, less accessible parts of the medical record (Woglom, 2021).

Purpose

This quality improvement project aimed to: (a) increase medical providers' knowledge of the functional capacity tool (PULHEAT) on patients in prison, (b) educate medical providers on the importance of the tool as an objective measure of the patient's functional status, and (c) assess the medical providers' willingness to change their practice, given evidence that better outcomes will result.

Review of Current Evidence

A comprehensive review of the literature was conducted using CINAHL, Google Scholar, and PubMed. The process and numbers of papers reviewed is described in the PRISMA diagram depicted in Appendix A. In the end, only twenty articles showed relevance to the problem, and six were included in the literature review (see Appendix A: PRISMA).

Functional Capacity/Assessment Tools

Currently, there are no standardized instruments in use to measure the functional abilities of the incarcerated. Many assessment tools exist, but these tools are shoe-horned into the prison system for lack of a better tool. There is a lack of instruments available to measure functional capacity in prisons because most functional capacity instruments have many items that are not applicable, such as taking public transport (De Smet et al., 2017).

A widely used assessment tool in rehabilitation is the Continuity Assessment Record and Evaluation (CARE) tool, which replaced the Functional Independence Measure (FIM™), but these tools are specific to physical rehabilitation and have many elements that are not applicable to corrections. Another assessment tool used in long-term care is known as the Minimum Data

Set (MDS), but this tool is also not appropriate for all areas of correctional healthcare. Numerous studies have determined the validity of both of these tools in their respective settings, and one study showed that the two tools are accurate by comparison to each other using a function-related group (FRG) classification (Li et al., 2016). These tools, used in different areas, are used for different outcomes. In long-term care, the MDS is used to determine both the needs of the individual for formulation of a plan of care, and the amount that the care provided should cost. In home health, the analog to the MDS is the Outcome and Assessment Information Set (OASIS). This tool is also inappropriate for use in corrections, because OASIS is designed to collect nearly 100 items related to clinical status, functional status, and service needs (O'Connor & Davitt, 2012). The CARE tool, used by many physical- occupational- and speech therapists, also determines a patient's needs, and has the added benefit of measuring the achievement of goals over the course of their rehabilitation. It is possible that the PULHEAT tool can be used to generate these data, however there is no evidence in the literature of this.

Quality Improvement in Corrections

Extensive documentation of use of correctional facilities for areas of quality improvement permeates the literature, and just as in all quality improvement activities, this begins with a solid base in the evidence. While journals are replete with benchmarks and research into quality for healthcare, correctional healthcare benchmarks remain largely a mystery (Barta et al., 2016). There may be several reasons for this. First, extra care must be undertaken to conduct research with this vulnerable population, and many researchers choose not to “jump through” the extra hoops and obstacles that are presented in researching this population. Put another way, the ethical considerations of conducting research in this area are too cumbersome (Coughlin et al., 2016). Another reason that there are no published tools or benchmarks is that

correctional institutions, like governments, are loathe to disclose any information, particularly if it could be used against them in court (Shelton et al., 2016). These are both reasons why research into the quality improvement is needed so desperately in corrections. There is a long history of peer-review amongst clinicians that provides a good example of quality improvement. Casting light in these dark places not only improves performance, but it is associated with better health outcomes of patients (Hill et al., 2018).

Assessment Tools in Corrections

Assessment tools used in corrections are often specific to mental health needs, such as the Forensic Camberwell Assessment of Need (CANFOR) instrument. Other tools, such as the World Health Organization Quality of Life Instruments (WHOQOL-BREF) measures needs by perceived health status, rather than an objective assessment by a medical provider (De Smet et al., 2017). These “universal” tools do not go far enough in their measurement because correctional facilities are too specialized an area to translate community health standards. For example, correctional facilities restriction of freedom of movement contribute to physical deconditioning, and a tool used in corrections could be used in the post-release assessment of healthcare needs (Bedard et al., 2016).

The ideal assessment tool would look like a combination of the CARE tool and the WHOQOL-BREF instrument. The CARE tool is used widely across rehabilitation settings, and was developed by a task force appointed by the Agency for Healthcare Research and Quality (AHRQ) a division of the Federal Department of Health and Human Services. It consists of 18 items: six are related to self-care, two are related to sphincter control, three are related mobility, two are related to locomotion, two are related to communication, and three are related to social cognition. Each item is scored by a clinician (nurse, therapist, or medical provider) on a five-

point scale, from one, which is complete dependence to five, which is complete independence. The CARE tool falls short in its scope of measuring quality of life and has no item related to instrumental activities of daily living (IADLs) (Li et al., 2017). The World Health Organization Quality of Life Instruments (WHOQOL-BREF) measures on a five-point ordinal scale of 1 to 5 in the physical health domain including mobility, daily activities, functional capacity, energy, pain, and sleep, but these measures are perceived and answered by questionnaire, instead of an assessment by a provider, like the CANFOR instrument. For example, in a questionnaire administered by De Smet et al. (2017), perceived health status was measured by the following question: “How would you assess your own health status in comparison with your contemporaries in prison” (p. 1573). Physical frailty was measured on the questionnaire by using the Tilburg Frailty indicator, which is a validated instrument that assesses the extent of frailty of older people, consisting of eight yes or no questions about general physical well-being, loss of weight, mobility (walking), balance, vision, hearing, strength in the hands, and tiredness. In summary, the need for an objective functional measure instrument that is accurate, valid, and can be used consistently in correctional healthcare cannot be taken lightly.

Conceptual Framework

Identifying a conceptual framework and/or theoretical model initiates the process of planning the educational program (Polit & Beck, 2017). Orem’s self-care Deficit Nursing Theory (SCDNT) was employed to encompass the transformation of people, services, and systems involved with patient care. Using Orem’s Self-Care Deficit Nursing Theory (SCDNT) as a theoretical framework helps define the deficit that exists and the provision of care by the prison system (Hartweg & Fleck, 2020).

The intent of the QI project is to improve the accuracy of the application of the

PULHEAT tool itself. As a theoretical framework, the SCDNT can guide the testing of the various functional indicators as measures of the facets of health of incarcerated persons within the North Carolina Department of Adult Correction (NCDAC). The SCDNT helps translate the evidence of quality improvement within NCDAC by providing a template for both the provision of nursing and medical care. SCDNT, being broad in its scope, must be operationalized further for use in a quality improvement project. The application of Orem's Theory to NCDAC's functional capacity tool leads to a better understanding of the tool itself. The application of Orem's SCDNT in developing a training program used in prisons can lead to greater job satisfaction, decreased turnover, and other positive effects on staff morale. In this way, the QI project will not only provide better outcomes for incarcerated persons, but the staff within prisons, as well. The next logical step is to develop a training program whose foundation is Orem's SCDNT and centers on its use in correctional healthcare implemented in prisons nationwide (Shelton, 2019).

Translational model

Components of Rogers' Diffusion of Innovation Theory, incorporated in the implementation of the in-service to the participants, provided the translational model for the project (see Appendix B: Translational Model). Rogers's theory employs a five-step process for knowledge translation and adoption, (1) knowledge, (2) persuasion, (3) decision, (4) implementation, and (5) confirmation (White et al., 2021).

Rogers' Diffusion of Innovation Theory describes a situation of how the implementation of the project will proceed. Rogers identifies five steps in the innovation-decision process and each step in the process is dependent on the individual's "buy in" and belief that their practice needs improvement. If the medical provider does not "buy in", they will have an unfavorable

attitude toward the educational program and not adopt the change – or attend the educational program at all (White et al., 2021). Rogers Diffusion Model with constructs is depicted in Appendix B.

The systematic approach of Rogers' theory allows for application of the constructs to this quality improvement project: First, the medical provider gains awareness of the functionality and utility of the tool. Second, the medical provider, after receiving the education, determines that the functional capacity tool has merit. Third, the medical provider chooses to alter their practice in usage of the tool. Fourth, the medical provider begins to use the tool in practice per their training. Finally, the medical provider decides to continue to use the functional capacity tool in the manner it was intended because they discover its worth.

The medical providers in the prison system largely represent what Rogers calls “the late majority.” They will not complete the training unless compelled to do so, despite their lack of knowledge of the tool. Many providers eschew innovation and prefer to stick to traditional assessment models (White et al., 2021). It is expected that through dissemination, diffusion will occur by way of peer-support of the innovation. As a result of successful implementation, there will be more utility, consistency, and reliability of the PULHEAT functional capacity tool. A side effect of the implementation will be better outcomes for patients, fewer requests for medical accommodations, and fewer requests for transfers to facilities with higher acuity.

Methods

Prior to implementation, this QI project was approved by the Institutional Review Boards (IRB) at Lenoir-Rhyne University, Hickory, North Carolina and the North Carolina Department of Adult Correction (NCDAC) in Raleigh, North Carolina (See Appendix D: IRB Approval of Exempt Status). An informed consent waiver was obtained by both institutions, as no patient

identification information was collected. HIPPA, along with all privacy and all security rules were followed (see United States Department of Health and Human Services [HHS] at <https://www.hhs.gov/hipaa/for-professionals/security/laws-regulations/index.html>). Since the population being studied in this project does not involve offenders, rather the medical providers who care for them (NPs, MDs, DOs, and PAs), no patient identification information was collected. There was no funding for the data collection.

Retrospective chart reviews were conducted using the electronic health record (EHR) known as HERO, which is an acronym that stands for Healthcare Electronic Record for Offenders. The term *offender* is used here for a person incarcerated in the state prison system. The term is an inclusive term because offender can refer to someone that may or may not be incarcerated but has some justice involvement. The American Correctional Association defines an offender as an “individual convicted or adjudicated of a criminal offense” (ACA, 2019, p. 304).

The patient’s chart in the electronic medical record has three distinct measures of overall physical ability for the offender, PULHEAT, patient acuity, and medical duty status (MDS). Patient acuity is similar to the PULHEAT tool; however, it differs in important ways. A licensed nurse determines first, patient acuity. Medical providers may not adjust the patient acuity. Patient acuity is an ordinal level measurement on a scale of one to four, and has a modifier of “A” for medical needs and “B” for mental health needs. Medical duty status is a narrative, often written by the nurse, and signed by the medical provider. According to facility policy, the PULHEAT shall be updated whenever a change in the MDS occurs (see Appendix C: Health Services Policy and Procedure Manual, NCDPS, 2014). In the researcher’s experience, there is a wide variation between the MDS, patient acuity, and the PULHEAT.

Design

This QI project encompassed six months of planning, development, implementation, data collection, and analysis (see Appendix F: Timeline). With permission of the stakeholders, the dissemination of the educational program occurred during a regular medical provider meeting via a virtual meeting, using Microsoft Teams®. The educational program, outlined in Appendix E and presented using Microsoft PowerPoint®, found eager participants in the medical providers of the chosen facility. Two MD's (Doctor of Medicine), three NP's (nurse practitioner), and the medical director participated in the educational program.

Population

The focus population will be providers of medical care in the State Prison System of North Carolina that assess the functional ability of patients using the PULHEAT tool. Inclusion criteria were a cohort of medical providers, belonging to one facility who routinely care for patients in the prison system with at least a year of correctional health experience. Exclusion criteria included less than one-year of experience in correctional healthcare, or not employed full-time as a medical provider by the State of North Carolina. All participants, invited by email to volunteer to be a part of the project, attended the educational program during their monthly facility provider meeting, overseen by the facility medical director. All participants who met the selection criteria were able to participate in the project.

Setting

An important facet of this project involved engaging experts in the fields of nursing informatics, information technology, and correctional nursing. The State Prison System of North Carolina serves over 30,000 incarcerated persons and provides for all their primary, secondary, and tertiary healthcare needs. About 1,500 nurses and about 100 providers (Doctor of Medicine,

Doctor of Osteopathic Medicine, Nurse Practitioners, and Physician Assistants) who provide direct patient care in more than 50 prisons Statewide. Collectively, these are correctional healthcare professionals. A correctional healthcare professional is a licensed professional (nurse or medical provider) that cares for and treats incarcerated persons, whether they be in prisons or jails. Correctional professionals perform procedures and practice in clinics and acute care settings (Shelton et al., 2020). The setting for the study was at the largest women's prison in North Carolina, located in Raleigh, NC. The analysis of the project was conducted primarily at the headquarters for the State Prison system of North Carolina.

Implementation and Data Collection

A formal education program, delivered to the medical providers at a prison located in Central North Carolina, comprised the intervention. All medical providers who met the inclusion criteria and agreed to participate in the QI project participated in the educational intervention. The educational program itself aimed to reduce the subjectivity of the assignment of functional capacity levels within each of the categories within PULHEAT (see Appendix E: Educational Plan).

Assessment of the effectiveness of the educational program employed the use of a retrospective chart review of PULHEAT scores pre- and post-intervention. Prior to the study, a chart review of offenders assigned a wheelchair, revealed the many inaccuracies of the PULHEAT tool. Ostensibly, any offender that is wheelchair-bound would have a score greater than one in one or more categories of PULHEAT, including P-Physical stamina, L-Lower Extremities, A-Activity Grade, and/or T-Transportation needs.

Data Analysis and Results

Using Intellectus™ Software (2023), the original plan for data analysis for the QI project was for a paired *t*-test to compare the means of the two samples of related data. However,

because the dependent variable was not normally distributed, a non-parametric statistic, the Wilcoxon Signed Rank Test was performed to evaluate whether the primary outcome was met (Conover & Iman, 1981). The null and alternative (two-tailed hypotheses) are: (a) H_0 : *There is no difference between the provider utilization of the PULHEAT functional capacity tool before and after the education program is delivered.* (b) H_A : *There is a difference between the provider utilization of the PULHEAT functional capacity tool before and after the education program is delivered.*

The dependent variable was the utilization of the PULHEAT tool. The dependent variable is the variable being tested, because it depends on the independent variable; the educational program. The level of measurement for the dependent variable is ratio. The education program is the independent variable, sometimes known as the cause. The level of measurement for the independent variable is nominal; the pair is either before or after the education program (Kellar & Kelvin, 2013).

Pre- and Post-intervention Summary Statistics

Summary statistics were calculated for observation one and observation two of the assessment scores for each category within PULHEAT functional capacity tool. Variables were coded as P1 for physical capacity's pre-intervention observation, P2 for physical capacity post-intervention, U1 for upper extremity pre-intervention, U2 for upper extremity post-intervention, and so forth. These data, shown in Table 1 below, reveal that most of the variables had a standard deviation (SD) of less than one, except for the first observations of activity grade (A1) with an SD of 1.04 and transportation needs (T1) with an SD of 2.02, and the second observation of transportation needs (T2) with an SD of 1.63. Of note, the absolute value of skewness for each of the variables was less than two except for the first observations of hearing (H1) with a

skewness of 2.62 and eyes (E1) with a skewness of 2.78 and the second observation of ears (E2) with a skewness of 2.56. None of the variables' absolute values for skewness were greater than three. Additionally, the kurtosis was less than three for each of the variables except for the first observations of hearing (H1) with a kurtosis of 5.47 and eyes (E1) with a kurtosis of 6.60, and the second observation of eyes (E2) with a kurtosis of 6.19. When the skewness is greater than two in its absolute value, the variable is considered asymmetrical about its mean. When the kurtosis is greater than or equal to three, then the variable's distribution is markedly different from a normal distribution in its tendency to produce outliers (Westfall & Henning, 2013). These pre- and post-intervention summary statistics can be found in Table 1 below:

Table 1: *Summary Statistics Table for Interval and Ratio Variables*

Variable	<i>M</i>	<i>SD</i>	<i>n</i>	<i>SE_M</i>	Min	Max	Skewness	Kurtosis
P1	2.77	0.94	30	0.17	1.00	4.00	-0.04	-1.05
U1	1.67	0.76	30	0.14	1.00	3.00	0.63	-0.96
L1	2.73	0.94	30	0.17	1.00	4.00	-0.45	-0.61
H1	1.20	0.55	30	0.10	1.00	3.00	2.62	5.47
E1	1.30	0.79	30	0.15	1.00	4.00	2.78	6.60
A1	2.87	1.04	30	0.19	1.00	4.00	-0.10	-0.73
T1	3.27	2.02	30	0.37	1.00	5.00	-0.27	-1.93
P2	2.70	0.88	30	0.16	1.00	4.00	-0.32	-0.50
U2	1.47	0.68	30	0.12	1.00	3.00	1.12	-0.0006
L2	2.93	0.58	30	0.11	2.00	4.00	-0.003	-0.001
H2	1.43	0.86	30	0.16	1.00	4.00	1.71	1.50
E2	1.30	0.70	30	0.13	1.00	4.00	2.56	6.19
A2	3.10	0.76	30	0.14	2.00	4.00	0.32	-0.16
T2	4.20	1.63	30	0.30	1.00	5.00	-1.50	0.25

Assumption of Normality

A Shapiro-Wilk test was conducted to determine whether the differences in the two observations could have been produced by a normal distribution (Razali & Wah, 2011). The results of the Shapiro-Wilk test were significant based on an alpha value of .05, $W = 0.67$, $p <$

.001. This result suggests the differences in the pre- and post-intervention observations are unlikely to have been produced by a normal distribution, indicating the assumption of the paired samples *t*-test is violated, necessitating the use of a non-parametric equivalent test.

The Wilcoxon Signed Rank Test.

Each of the categories within PULHEAT were analyzed to examine whether the mean difference of the two PULHEAT assessments were significantly different from zero. The functional capacity scores of lower extremities (L), activity grade (A), and transportation needs (T), showed the result of the two-tailed Wilcoxon signed rank test was significant based on an alpha value of .05, $p = .017$, indicating the null hypothesis, *There is no difference between the provider utilization of the PULHEAT functional capacity tool before and after the education program is delivered*, can be rejected.

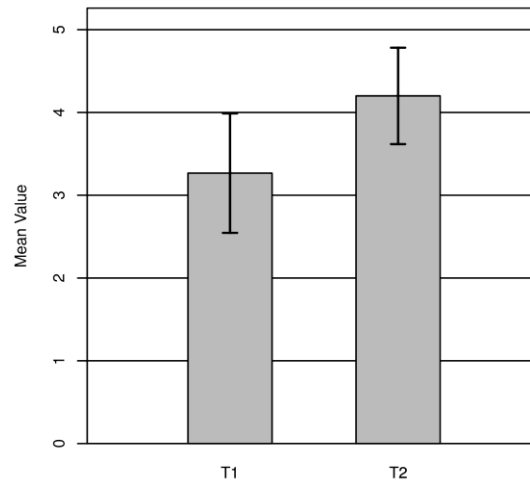
This finding suggests the difference in the mean of the first assessment (prior to the intervention) and the mean of the second intervention (after the intervention) was significantly different from zero for the scores of lower extremities, activity grade, and transportation needs. The results of the two-tailed Wilcoxon signed rank test were significant based on an alpha value of .05, $V = 5.00$, $z = -2.54$, $p = .017$. This indicates that the differences between the two observations are not likely due to random variation. The median of observation one (3.27) was significantly lower than the median of observation two (4.20). The results of transportation needs are presented in Table 2. Figure 1 presents a boxplot of the ranked values of the two observations.

Table 2: *Wilcoxon Signed Rank Test for the Difference Between observations*

Observation one		Observation two		<i>T</i>	<i>p</i>	<i>d</i>
<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
3.27	2.02	4.20	1.63	-2.54	.017	0.46

Note. N = 30. Degrees of Freedom for the *t*-statistic = 29. *d* represents Cohen's *d*.

Figure 1: *The means of observation one and observation two with 95.00% CI Error Bars*



Outcomes Evaluation

The quality improvement project, delivered to 100% of the full-time medical providers at the chosen facility, was able to garner support by the medical director of the facility, and the educational program became the centerpiece of a monthly provider meeting. The outcome of the Wilcoxon signed rank test using a retrospective chart review for knowledge acquisition revealed that there is a statistically difference between the results of the PULHEAT tool before and after attendance of the educational program. This means that the medical providers demonstrated increased knowledge of the functional capacity tool as evidenced by an increased utilization (and increased accuracy) of the tool following the educational program. The Wilcoxon signed rank test demonstrated a statistical significance with a $p < 0.1$ ($\alpha = 0.74$, $p = .017$) using the statistical software Intellectus™ (2023). The secondary outcome of the project aspires to provide the highest quality medical care to ensure that each patient seen in the North Carolina State Prison System achieves the maximum function possible, and that this function, measured objectively,

improves over time. The success of this outcome remains to be seen, but if history teaches anything, it is that more accurate assessments lead to better outcomes for patients overall.

Limitations

Even though the population of study includes all medical providers within a particular facility, this sample represents only a small sample of the total population. This sample size likely does not have sufficient power to generalize to the whole department or other prison systems outside the State of North Carolina. Many health interventions do not lend themselves to transferability, specifically transferring from one setting to another. The term, transferability, refers primarily to qualitative research design (Kellar & Kelvin, 2013). Generalizability, analogous to transferability, refers to a quantitative study design. Generalizability is the extent to which the results of a given study applies to a wider population, another setting, or another time (Kellar & Kelvin, 2013). Often administrators fall into a trap of assuming that works in one population or setting, will work in another. This highlights the threat to external validity. Again, when conducting an experiment under heavily controlled laboratory setting, attempting to translate the research outside the laboratory becomes a challenge. This represents a limitation in this quality improvement project.

In the NC Department of Adult Correction, the stakeholders in the Comprehensive Health Services Section exemplify transformational leadership. Transformational leadership is a specific style of leadership that promotes positive organizational outcomes and processes in health care, including work environmental factors and patient safety. A defining characteristic of transformational leaders includes encouragement of the growth and development of their employees. Transformational leaders motivate their employees to look beyond their own self-interest, substituting it with the needs of the entire group (Ree, 2020). The Deputy Secretary of

Comprehensive Health Services, the Chief Medical Officer and the Chief Nursing Officer continuously encourage growth and development of their employees. This quality improvement project has full support of these stakeholders in administration. Despite widespread support, there will be challenges to meet.

Using the *Hexagon Discussion Analysis Tool*, developed by the National Implementation Research Network at the University of North Carolina at Chapel Hill, factors that might facilitate the translation of a potential project to practice or policy include program indicators and implementing site indicators. Program indicators analyze practice or policy that will be implemented in three domains: evidence, supports, and usability. Implementing site indicators measure how much a practice or policy meshes with the implementing site with regard to three other domains: population need, fit, and capacity (Metz & Louison, 2018).

Within the program indicators, the domain of usability might facilitate the translation of the proposed DNP project, given that the functional capacity tool, PULHEAT, is a well-defined program that is adaptable for any context. Within implementing site indicators, the domain of fit might facilitate the translation of the proposed DNP project, in that the goals align with the priorities of the organization and the potential impact that the project has on other interventions and initiatives such as determining the incarcerated persons' fitness for work duty (known as medical duty status) and their nursing level of care (known as acuity) (Metz & Louison, 2018).

Using the same *Hexagon Discussion Analysis Tool*, identified in question one, factors that might hinder the translation of a potential project to practice or policy also include program indicators and implementing site indicators. Under the program indicators, the domain of supports presents a challenge. Very few practitioners know how to properly use the PULHEAT DMR tool, and most have no idea what uses the tool has. Consequently, the section which

determines where an incarcerated person is to be housed, the population management section, ignores the data placed by the practitioners into the functional capacity tool, except for the “M” in PULHEAT DMR. Mental health providers have historically been the only group of practitioners that consistently grade incarcerated persons using the “M” for mental health needs in the tool. However, there is evidence that shows that although the “M” is consistently being recorded, it is not entirely accurate because mental health providers tend to grade incarcerated persons at a level “3” for their health care needs if they are being seen regularly by any mental healthcare provider. Level “3” should be used for those receiving psychotropic medications that require routine assessment and dosage adjustment. Those incarcerated individuals that are not on psychotropic medications, and are only being seen by mental health providers, should be scored at level “2” on the tool in the “M” category (Metz & Louison, 2018).

Within the implementing site indicators, the domain of “capacity to implement” presents a limitation to the translation of the proposed DNP project. This limitation is largely because the operationalized process of implementation does not have sufficient buy-in from the medical providers, those who are responsible for application of the functional capacity tool in the prison system (Metz & Louison, 2018).

In order to combat the “supports” limitation, adequate training must be delivered, expert assistance must be readily available for those who need it, and close supervision and coaching need to be used to ensure both that the changes are “sticky” and that the tool is being consistently and correctly administered (White et al., 2021).

To address the “capacity to implement” limitation, there needs to be a sustained effort to advertise the training program, and a concentrated effort to explain the usefulness of the functional capacity tool. The tool, PULHEAT, in its current form, is not being administered

consistently, and when it is administered, it is often wrong. For this and other reasons, practitioners feel that the tool itself is a waste of time and they often bypass the prompts in the electronic health record to update the PULHEAT tool when a patient's medical duty status changes, the patient's acuity changes, or another reason prompts the update the PULHEAT, such as regularly scheduled physical examinations. Obtaining buy-in is probably the single most important aspect of the success or failure of the project's system wide implementation. Identification of champions of the tool assist in obtaining buy-in as these champions pressure their peers to look upon the tool as a valuable insight into the functional capacity of a patient, instead of just a regulatory hoop that one must go through when completing their documentation the electronic health record (White et al., 2021).

Discussion

The results that the quantitative study enabled rejection of the null hypothesis and acceptance of the alternative hypothesis; *there is a difference between the provider utilization of the PULHEAT functional capacity tool before and after the education program is delivered*. The amount of training that the providers receive in the administration of the PULHEAT tool is negligible prior to the implementation of this quality improvement project. Following implementation, the important factor then becomes the tendency of the project to remain long after delivery of the educational program.

Development of the education program tailoring to meet the needs of the medical providers assisted in providing motivation for taking part in the study. Part of the educational program delivered to the medical providers allowed the participants to see the value in the consistent administration of the functional capacity tool. Following the study, interviews with members of the diagnostic team will determine some of the benefits of the quality improvement project.

Diagnostics, also known as population management, uses the PULHEAT DMR tool (along with other measures) to help determine where an offender is placed within the State Prison System. Placing offenders appropriately not only saves time and money for the State, but it also improves the quality of life for the offenders. Future studies can determine what level of improvement in the quality of life and outcomes of patients are following the implementation of the project.

Conclusion

Essential to determining a patient's needs and initiation of a plan of care is the conduction of an assessment of the functional capacity of the patient, particularly those with chronic or acute illnesses. Just as the rest of the country, the fastest growing segment of the prison population are those over 65 years of age. The tool used by providers in the State of North Carolina, known as PULHEAT, has been in use for over 20 years. Currently, there is little or no training provided for the administration of this functional capacity tool. The aim of this quality improvement project was met: to develop, implement, and evaluate an educational program designed to assist the medical providers within the state of North Carolina Prison System in the administration of the PULHEAT functional capacity tool. The ultimate goal of the project aims to provide the highest quality medical care to ensure that each patient seen in the North Carolina State Prison System achieves the maximum function possible, and that this function, measured objectively, improves over time.

Since this functional capacity tool has been in use for over 20 years, the validity of the tool itself to adequately assess the functional abilities of patients is in question. Further research to test the tool is the next logical step, however, this may be difficult, given the population in question; incarcerated persons. The results of this quality improvement project will be disseminated to the stakeholders and published in nursing journals such as Rehabilitation

Nursing and correctional industry journals such as Correct Care. Finally, the results of this project will be presented to the National Commission on Correctional Healthcare at their annual convention, and the Association of Rehabilitation Nursing at their annual education conference, both in 2023.

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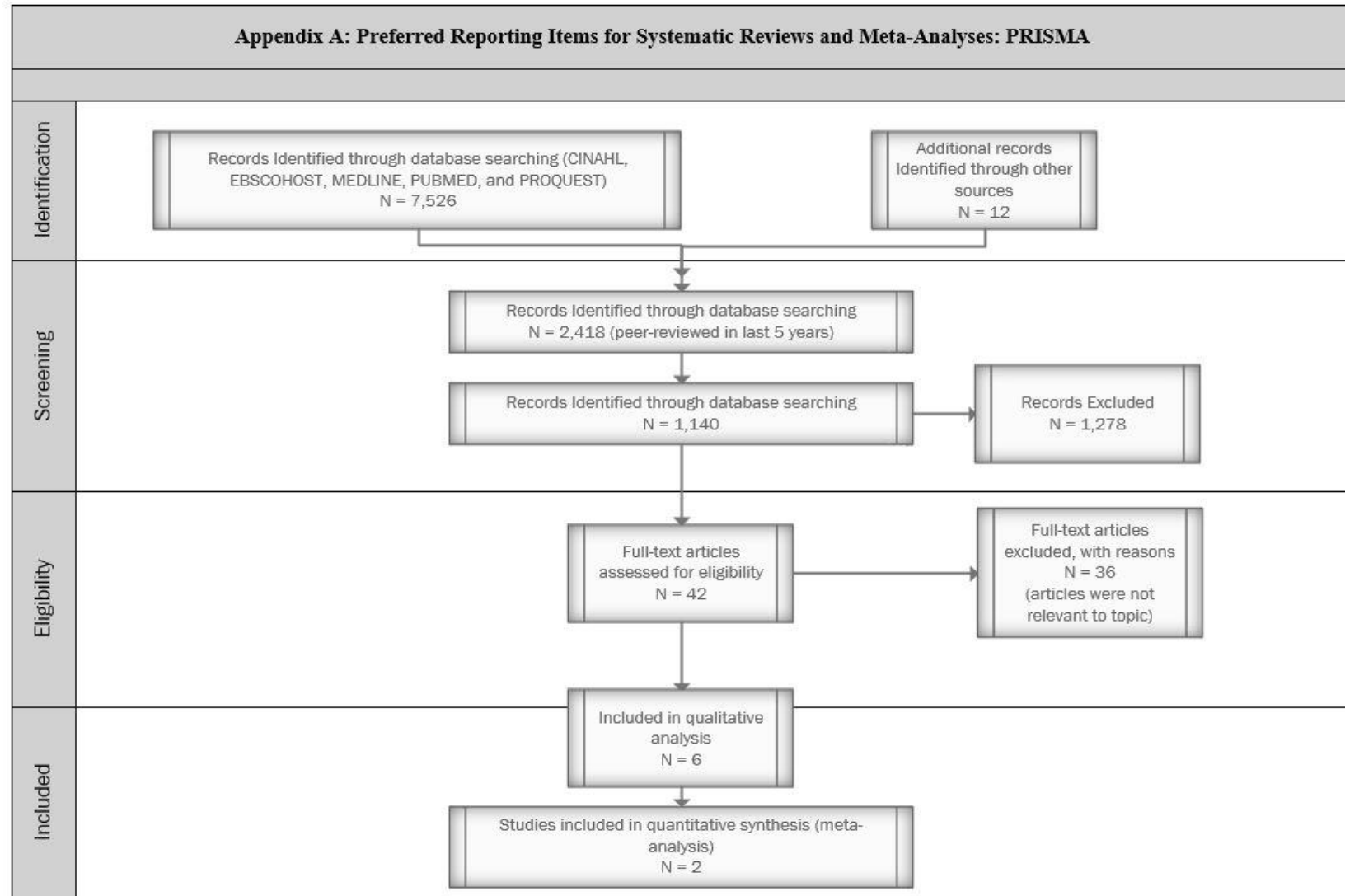
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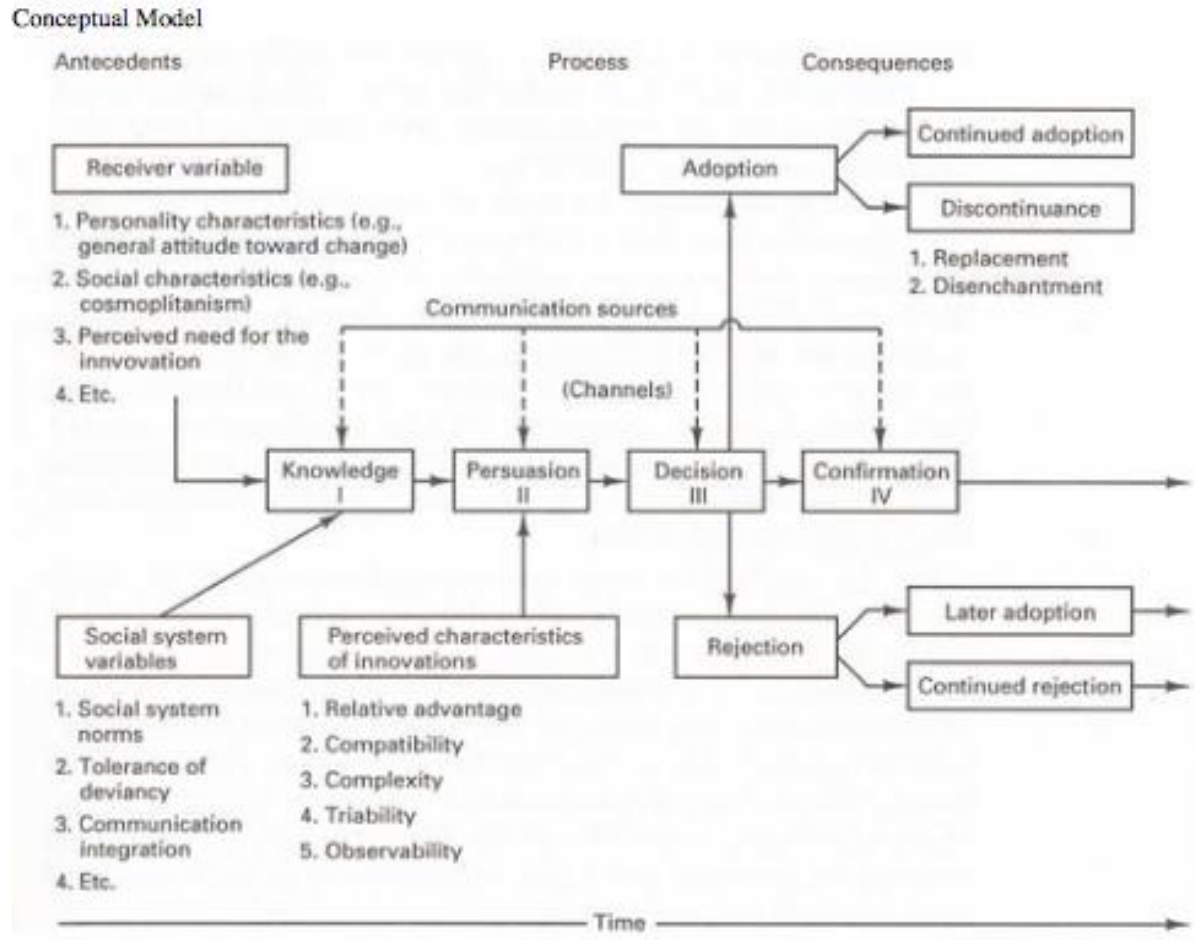
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Appendix A: PRISMA



(Moher et al., 2009)

Appendix B: Rogers' Diffusion of Innovation Translational Model



(Mohammadi et al., 2018).

Appendix C: HEALTH SERVICES POLICY & PROCEDURE MANUAL

North Carolina Department of Public Safety – Prisons

SECTION: Assessment of Patient POLICY # A - 2

SUBJECT: Intake Physical Exam and PULHEAT System

PURPOSE

To provide guidelines for completion of a physical exam and health profile.

POLICY

A complete history and physical examination will be accomplished at the Reception and Diagnostic Center by appropriate health professionals, as soon as possible, and no later than (7) business days after admission. Each offender in the North Carolina Department of Public Safety, Prison / Health Services (NCDPSP/HS) will be assigned a health profile resulting in an activity grade which indicates the offender's overall ability to participate in jobs, programs, activities, and services. If a complete history and physical has been completed within the previous ninety (90) days, a new appraisal is not required except as determined by designated provider.

PROCEDURE**I. SCOPE OF EXAMINATION**

This examination will be completed and documented in the Electronic Health Record (EHR) by nurses using the Intake module and providers using the History and Physical module and their associated finalization screens

- A. Physiological measurements will be accomplished to include height, weight, temperature, pulse, blood pressure, near and far vision, and the results recorded by nursing in EHR on the vital signs flow sheet and vision screen.
- B. Laboratory screening test in accordance with guidelines set forth by the Chief of Health Services/ Medical Director.
- C. Immunization Status
 - a. Tetanus (Td) - Offenders reporting a history of not receiving a Td vaccine in the past 10 years are to be educated on the purpose of the vaccine and given if no contraindications (documented in the EHR Intake – Immunization)
 - b. Mantoux skin test – Offender will be given in accordance with current policy (documented in the EHR Intake section – Tuberculosis Screening).
- D. Physical Examination
 - a. The provider (physician/physician extender) will complete exam at next scheduled clinic.
 - b. Provider will review all documentation relative to offender's health history prior to physical examination and:
 - i. Complete History and Physical in the EHR.
 - ii. Assign initial health profile on the PULHEAT tab of the finalization screen in EHR.
 - iii. Indicate activity restrictions on the MDS tab of the finalization screen in EHR.
 - c. Physical findings will be recorded in the EHR History and Physical
 - d. Offenders readmitted to prison within 12 months of last physical will have health record reviewed by the provider and updated as needed.
 - e. Offenders readmitted to prison within 12 months of last physical and no previous healthcare records are available, will have complete intake examination.

II. HEALTH PROFILE

The health profile system set forth in this policy is based primarily upon the function of body systems and their relation to jobs, programs, activities, and services in the North Carolina Department of Public Safety/Division of Adult Correction (NCDPSP/HS.) Since the analysis of the individual's medical, physical, mental and dental status plays an important role in assignment and welfare, not only must the activity grading be executed with great care, but clear and accurate documentation of deviations from normal are essential.

Each facility will be evaluated and given a P-U-L-H-E-A-T-D-M-R profile based on the:

1. Available accommodations,
2. Available jobs, programs, activities, and services.

The offender's health profile and the facility profile should match. Housing assignments are based on these two factors. The basic purpose of the profile is to provide an index to overall functional capacity. Therefore, the functional capacity of a particular organ or system of the body, rather than the defect per se, will be evaluated carefully in determining the numerical designation. This overall functional assessment reflects consideration of physical, dental, and mental health status.

For ease in accomplishing and applying the profile system, these categories have been designated:

P - Physical Capability
U - Upper Extremities
L - Lower Extremities
H - Hearing
E - Eyes (vision)
A - Activity Grade
T - Transportation Demand
D - Dental
M - Mental Health Status
R - Retardation

Numerical or alphabetical designations are used to reflect different levels of functional capacity for each category. These are outlined in accompanying attachments.

- A. Guidelines for the utilization of this overall activity grade ("A") are set forth in the Attachments to this section.
- B. When re-evaluation of an offender's activity grade is appropriate; changes in the PULHEAT Profile are to be documented in EHR within 24 hours.

III. OVERALL ACTIVITY GRADE ASSIGNMENT

- A. The initial activity ("A") grade assignment will be made at the time of admission processing and should be accomplished based upon the actual results of the offender's health assessment.
- B. The intent of the overall activity grade ("A") is to:
 - a. Ensure that the offender's health needs are met
 - b. Ensure that offender is not excluded from work or program privileges unless a bonafide health reason exists
- C. A change in the activity grade ("A") may be made at any time an offender has an encounter (face to face meeting) with health care personnel and that encounter indicates need for a change.
- D. The change in activity grade ("A") can be made by a physician, physician extender, dentist, psychologist, or licensed clinical social worker.
- E. The deliberate assignment of an inappropriate activity level ("A") is fraudulent, a violation of this policy, and may result in DPS disciplinary action.

IV. EXPLANATION OF HEALTH PROFILE CATEGORIES

- A. **P** - Physical capacity or stamina: This factor relates to general physical function. It is impacted by medical, dental, and mental health conditions which do not fall under other specific factors of the system. In arriving at the profile under this factor, it may be appropriate to consider strength, endurance, height-weight-body build relationship, agility, energy, and muscular coordination.
- B. **U** - Upper extremities: This factor relates to the hands, arms, shoulder girdle, and upper back (cervical, thoracic and upper lumbar) in regard to strength, range of motion, and general efficiency.
- C. **L** - Lower extremities: This spine factor relates to the feet, legs, pelvic girdle, lower back musculature, and lower back (lower lumbar and sacral spine) in regard to strength, range of motion, and general efficiency.
- D. **H** - Hearing and ears: This factor relates to auditory acuity, diseases, and defects of the ear.
- E. **E** - Eyes: This factor relates to visual acuity, diseases, and defects of the eye.
- F. **A** - Activity grade: This overall factor relates to institutional assignment and limitations affecting an offender's ability to participate in jobs, programs, activities, and services.
- G. **T** - Transportation: This factor relates to the designation as to whether special transportation requirements exist due to the offender's health condition.

V. ASSIGNMENT OF HEALTH GRADES

- A. Numerical designations are assigned after evaluating the individual's functional capability in each category.
- B. See **Attachment A** Guidelines For Classifying Health Categories and Codes along with numerical designations.
- C. A profile containing a numerical designation of "5" indicates special conditions as defined, and may or may not limit or restrict work or program assignments.
 - a. A temporary designation of a pregnant offender will be shown as "5" in the "P" category.
 - b. A temporary designation for an offender in an inpatient Mental Health facility will be shown as "5" in the "M" category.
 - c. A temporary designation for an offender who requires special attention while in transit will be shown as "5" in the "T" category.

VI. PROFILING PREGNANT OFFENDERS

- A. The intent of these provisions is to protect the fetus and the mother while placing the least restrictions on the offender.
- B. A physical profile (P) for pregnant offenders will be issued as follows:
 - a. Under physical profile "P", a numerical grade of "5" will be used to indicate pregnancy.
 - b. A "P" profile grade of "5" will indicate the following limitations:
 - i. Restrictions for jobs, programs, activities, and services will be defined by the appropriate health care clinician.
 - ii. Exemption from all immunizations except influenza and tetanus-diphtheria, unless otherwise ordered by the clinician.
 - iii. No assignment to jobs, programs, activities, and services wherein nausea, easy fatigability, or sudden light-headedness might occur
- C. A "P" grade of "5" will be assigned for the duration of the pregnancy and post-partum period. At end of pregnancy, a new "P" grade will be issued reflecting revised physical status.
- D. During the last 3 months of pregnancy, offender must rest 15 minutes every 4 hours (sitting in a chair with feet up is acceptable) and the program activity week should not exceed 40 hours.
- E. Offenders experiencing a normal pregnancy may continue jobs, programs, activities, and services until delivery.
- F. Pregnant offenders who may be experiencing unusual and complicated problems (e.g., pregnancy - induced hypertension) will be evaluated by the appropriate healthcare clinician to determine if they should be excused from jobs, programs, activities, and services or allowed limited participation.

VII. PERIODIC HEALTH ASSESSMENT

- A. Offenders receive periodic health assessments to insure optimal health status based upon:
 - a. Age
 - b. known health problems
 - c. medications
 - d. preventive health guidelines.
- B. Periodic health assessments will be documented based on age.
- C. At a minimum, the following schedules will be used for physical examination:
 - a. >50 – yearly
 - b. <50 – every 5 years

Appendix D: IRB Approval of Exempt Status

To: Ramesh Upadhyaya
From: Randall Bergman, IRB Chair
Subject: Protocol #2022/09/7
Date: 09/14/2022

The protocol 2022/09/7. Effectiveness of In-service Education to Enhance the Knowledge of Medical Providers in the Application of a Functional Assessment Tool in Corrections has been verified by the Lenoir-Rhyne University Institutional Review Board as a Quality Improvement Project, and accordingly does not meet the definition of "research" at to 45CFR46.102(d). Your protocol is thus exempt from IRB review. Please note that changes to your protocol may affect its exempt status. Please contact me directly to discuss any changes you may contemplate.

Thanks,

Randall Bergman, IRB Chair
randall.bergman@lr.edu

Appendix E: Educational Plan / Outline of Content

Educational Objectives (5 sessions to be held with each session 60 minutes in length):

Participants will describe categories of the PULHEAT functional capacity tool

Participants will apply content presented to a case scenario

- I. Introduction (3 minutes)
 - A. **Who needs PULHEAT training?**
 - B. **What is the purpose of PULHEAT?**
 - C. **What's the difference/comparison between:**
 1. **PULHEAT**
 2. **Patient Acuity**
 3. **Medical Duty Status / Activity restriction**

- II. Categories (functional capacity factors) (20 minutes)
 - a. **P** - Physical capacity or stamina: This factor relates to general physical function. It is impacted by medical, dental, and mental health conditions that do not fall under other specific factors of the system. In arriving at the profile under this factor, it may be appropriate to consider strength, endurance, height-weight-body build relationship, agility, energy, and muscular coordination.
 - b. **U** - Upper extremities: This factor relates to the hands, arms, shoulder girdle, and upper back (cervical, thoracic and upper lumbar) concerning strength, range of motion, and general efficiency.
 - c. **L** - Lower extremities: This spine factor relates to the feet, legs, pelvic girdle, lower back musculature and lower back (lower lumbar and sacral spine) concerning strength, range of motion, and general efficiency.
 - d. **H** - Hearing and ears: This factor relates to auditory acuity, diseases, and defects of the ear.
 - e. **E** - Eyes: This factor relates to visual acuity, diseases, and defects of the eye.
 - f. **A** - Activity grade: This overall factor relates to institutional assignment and limitations affecting an offender's ability to participate in jobs, programs, activities, and services.
 - g. **T** - Transportation: This factor relates to the designation as to whether special transportation requirements exist due to the offender's health condition.
 - h. **D** – Dental: This factor relates to all dental or dental-related health issues.
 - i. **M** – Mental health status: This factor relates to an individual's mental health status, and any sign of mental illness.
 - j. **R** – Retardation: This factor relates to the extent of intellectual disability or adaptive behavior deficit.
 - k. Special considerations for "P" "M" and "T" categories

- III. The overall activity grade “A” (5 minutes)
 - A. Intent**
 - B. Admission processing**
 - C. Changes in activity grade**

- IV. Guidelines for classifying PULHEAT numerically (10 minutes)
 - A. Disease-specific guidelines for the “P” category
 - a. Asthma
 - b. Cardiovascular disease / Hypertension
 - c. COPD
 - d. Musculoskeletal
 - e. Seizure disorders
 - f. Skin disorders
 - g. If any of these chronic diseases are present, then refer to the disease-specific guidelines, discussed after the general category guidelines
 - h. If none of these disease-specific guidelines apply, then the “P” category is numerically classified according to level of deficit/self-care on a one to five scale
 - B. Classification guidelines for each of the other categories

- V. Activity restrictions (2 minutes)
 - A. Any category assigned as a “2” or higher requires the completion (review) of Medical Duty Status (for activity restrictions)**
 - B. Medical duty status and supporting clinical documentation**

- V. PULHEAT and the American Disability Act of 1990 (3 minutes)
 - A. Identify patients that may need ADA accommodations at each patient encounter and refer appropriately.**
 - B. Clinical Documentation that validates diagnosis and restrictions.**
 - C. Complete and thorough history and physical documentation.**
 - D. Documentation that correlates and supports the PULHEAT rating.**
 - E. Update the PULHEAT at appropriate intervals**

- VI. Special circumstances (2 minutes)

- VII. Summary, review, and case study discussion (15 minutes)

Appendix F: Timeline

		Month (in 2023)					
		January	February	March	April	May	June- July
Task	Education / Kick off to providers at selected site	X					
	PULHEAT assessments completed and data collection (retrospective chart audits)		X	X	X		
	Analysis of outcomes				X		
	Project Write up / Summary				X		
	Results presented Committee and Stakeholders					X	
	With approval, results disseminated to rehabilitation and correctional healthcare						X