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Implementing an Evidence-Based Algorithm for the Diagnosis and Evaluation of Iron Deficiency Anemia (IDA) in Female Basic Military Training Recruits Melissa Everage, Virginia Frazier, Nicholas Robertson, and Matthew Simmons Uniformed Services University of the Health Sciences

DISCLAIMER: Due to the impact of the COVID19 Pandemic, 2020 graduates of the Daniel K. Inouye Graduate School of Nursing were deemed critical to the mission of caring for the health of the nation and had an accelerated graduation. All phases of the DNP Project were complete, and met the standards and rigors of a quality DNP Project with an abbreviated dissemination timeframe

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#### Abstract

Phase II Site: Joint Base San Antonio-Lackland (JBSA-L), Wilford Hall Medical Center
Project Title: Implementing an Evidence-Based Algorithm for the Diagnosis and Evaluation of
Iron Deficiency Anemia (IDA) in Female Basic Military Training Recruits
Authors: Melissa Everage, Virginia Frazier, Nicholas Robertson, Matthew Simmons
Background: Approximately 25% of United States Air Force (USAF) Basic Military Training
(BMT) female recruits entering BMT are anemic, mostly due to iron deficiency (ID) and iron
deficiency anemia (IDA), with rates as high as 77% in other military female recruit cohorts.
Currently, a standardized, evidence-based algorithm is not used at the Reid Medical Clinic
(RMC) to diagnose and evaluate ID/IDA, contributing to an overuse of diagnostic studies,
erroneous medical diagnosis, and poor follow-up.

**Clinical Question:** Can the use of an evidence-based educational platform to educate Reid Clinic Providers result in an 11% improved adherence rate to the American Academy of Family Physicians (AAFP) algorithm for the evaluation and diagnosis of IDA among reproductive-aged female BMT recruits compared with current practice?

**Design:** The RE-AIM framework guided a three-month retrospective chart review comparing providers' current evaluation and diagnostic practices to the AAFP IDA algorithm recommendations. An interactive, provider-centered educational class with case studies, pre/post-tests, handouts, monthly staff meetings, selected project champions, and three months of post-workshop biweekly chart audits were completed.

**Analysis of the Results:** Comparison of a three-month retrospective chart review containing 126 records with a three-month post-implementation chart review containing 170 records revealed a 43.75% increase in compliance to the AAFP algorithm. There was a reduction in

diagnostic studies post-implementation which resulted in an estimated savings of \$105,248.00 annually, if fully adopted.

**Organizational Impact/Implications for Practice:** The RMC shows increased compliance with algorithm utilization, with a continued rise anticipated. Sustainability is maintained by selecting a change champion as well as acquiring a mandated policy letter from the Medical Director, enforcing the AAFP algorithm. Globally, we propose a DHA/DOD-wide policy adoption for facilities managing healthcare for a similar target population enrolled in rigorous training programs that may lead to an estimated cost-savings approaching \$500,000.00 annually.

*Keywords*: [Clinical Practice Guideline (CPG), American Academy of Family Physicians (AAFP), Iron deficiency (ID), iron deficiency anemia (IDA), United States Air Force (USAF), Basic Military Training (BMT), female recruits, adherence rate]

### Introduction

Iron deficiency (ID) and iron deficiency anemia (IDA) is a global health concern. Every year, 35,000-39,000 recruits enter Air Force Basic Military Training (BMT). (Terdiman, 2014; F. Tran, personal communication, December 10, 2019). According to the Air Force Personnel Center (AFPC) (2019), 20-26% of the Air Force is female (F. Tran, personal communication, December 10, 2019). Upon accession to BMT, recruits undergo increased physical and emotional stress during their eight weeks of training. These stressors may induce ID or IDA in females, especially among those who have borderline-low iron levels at the start of training. The consequences of ID may lead to negative downstream effects for both the individual recruits and the Air Force, to include: an interruption and prolongation in training, unfilled personnel positions, and a decrease in military mission readiness. Further, these negative outcomes cost the United States (U.S.) Government approximately \$22,000-\$25,000 per Airman failing to complete BMT (Table D-1) (Bartlett & Stankorb, 2017; F. Tran, personal communication, December 10, 2019).

Due to the health and military readiness implications, it is imperative that the Primary Care Providers (PCPs) at the JBSA-Lackland Reid Clinic where the recruits receive outpatient healthcare services are using a standardized, evidence-based method in evaluating and diagnosing IDA among this patient population. However, it has been noted that there is variation among the PCPs in their management of this condition. Clinical Practice Guidelines (CPGs) or algorithms developed by a panel of experts in their organizational field are intended to reduce clinical variation among providers, translate and promote current research into practice, decrease medical costs by omitting unnecessary orders, and improve patient outcomes (Fischer, Lange, Klose, Greiner, & Kraemer, 2016). Some of the barriers to provider adherence to CPGs or

algorithms may be they are unaware that one exists, they are unfamiliar with the guideline's content, they disagree with the recommendations, or the recommendations are too time-intensive (Graham, 2014).

After performing a literature search of published algorithms for diagnosing IDA, there were a few recommended algorithms published by professional medical organizations. However, none of these algorithms appear to have been tested or determined to be the best for diagnosing and evaluating IDA. Therefore, given the target group of providers at the Reid Clinic are more closely identified as Primary Care Providers, the AAFP (2019), the main professional organization that is solely committed to 134,600 PCPs and medical students, was the most reasonable professional organization to follow. The AAFP published a proposed algorithm standardizing the evaluation and diagnosis of IDA (Short & Domagalski, 2013). The purpose of this project is to determine if the use of an evidence-based educational platform during the implementation of the AAFP's algorithm for diagnosing and evaluating IDA among reproductive-aged female BMT recruits leads to greater than 11% provider adherence to the CPG at the Reid Clinic. Authors of previous studies noted an improved provider adherence rate between 6 to 12% to CPGs with educational and/or local opinion leader interventions (Fischer et al., 2016; Flodgren et al., 2011; Forsetlund et al., 2009).

## **Significance of the Problem**

The significance of ID in females is a global issue. Iron deficiency is not isolated to one geographic population like some diseases, but rather, it spans approximately half of the world's female population (Murray-Kolb & Beard, 2007). Reproductive-aged women are among the most affected, particularly if also experiencing poor nutrition, increased metabolic demands, and

heavy or abnormal menstruation. If ID is severe enough, it may lead to IDA and cause decreased cognitive or physical functioning (Murray-Kolb & Beard, 2007).

More than 25% of U.S. Air Force (USAF) BMT female recruits have anemia, mostly due to ID (Myhre et al., 2016). According to Murray-Kolb and Beard (2007), the exacerbation of ID and IDA in physically demanding environments is manifested through a decline in cognitive and physical functioning. This decline in functioning often results in injury, poorer physical fitness testing, and decreased task efficiency, resulting in increased attrition and decreased BMT graduation rate (Bartlett & Stankorb, 2017; Murray-Kolb & Beard, 2007; Myhre et al., 2016). When a single recruit does not complete BMT, there is an approximate net loss of \$22,000-\$25,000 (Bartlett & Stankorb, 2017; F. Tran, personal communication, December 10, 2019). Anemia contributes to the six percent or 2,100 recruits that are unable to complete training every year (Bartlett & Stankorb, 2017). Currently, the discharge rate for anemic BMT recruits is between 9.0% to 20%, depending on severity, with severely anemic recruits being three times more likely to be delayed from BMT graduation or discharge from military service (Myhre et al., 2016). Each trainee lost to attrition results in an unfilled position, thereby negatively impacting military mission readiness.

If PCPs are not adhering to recommended CPGs or algorithms in the evaluation and diagnosis of symptomatic female BMT recruits, they may be ordering more diagnostic studies than necessary, which increases costs, workload, and time to diagnosis and treatment (Fischer et al., 2016). The military is not exempt from the skyrocketing medical costs plaguing the U.S. healthcare system, seven percent of which is due to unnecessary diagnostics and treatment interventions (Trietsch et al., 2017). Additionally, clinicians managing the care of the female

BMT recruits have to be more efficient and mindful of the limited time BMT recruits have to spend with the PCPs as they have to adhere to a rigid BMT training schedule.

### **Clinical Question**

Can the use of an evidence-based educational platform to educate Reid Clinic Providers result in an 11% improved adherence rate to the AAFP algorithm for the evaluation and diagnosis of IDA among reproductive-aged female BMT recruits compared with current practice?

### **Focus Areas**

Initially, the focus was to identify the most effective evidence-based strategic tool shown to increase PCP adherence to CPGs implemented in outpatient clinical settings. Secondly, the focus was to implement the AAFP algorithm for evaluation and diagnosis of ID/IDA among female BMT recruits presenting to the JBSA-Lackland's Reid Clinic.

### **Project Short- & Long-Term Goals**

Our short-term goal was to identify the most highly-effective, evidence-based strategy tool to increase adherence of CPGs among PCPs, reduce inappropriate variation in practice and health care costs, and ultimately improve safety and patient outcomes (Fisher et al., 2016). Through the evaluation of current practices and evidence-based literature, a long-term goal was to recommend that the PCPs located at the JBSA-Lackland's Reid Clinic adopt the AAFP algorithm for the diagnosing and appropriate management of ID/IDA in reproductive-aged female BMT recruits.

## **Relevance to Military Nursing**

As Advanced Practice Registered Nurses (APRNs), early disease recognition is paramount to positive health outcomes. As healthcare providers, it is our duty to recognize presenting signs and symptoms of ID and IDA, order appropriate diagnostic studies, and deliver

timely interventions to prevent further sequelae (Wilson & Brothers, 2010). Patients with ID or IDA may be asymptomatic, but may present with repeated failed PT test scores, or have common signs and symptoms such as generalized fatigue, headaches, cognition or mood disturbances, and decreased exercise endurance (Murray-Kolb & Beard, 2007; Wilson & Brothers, 2010). Labs that confirm the diagnosis typically include a Complete Blood Count (CBC) with low hemoglobin and Mean Corpuscular Volume (MCV) and decreased iron stores, as indicated by low serum ferritin (SF), increased total iron-binding capacity (TIBC), and low transferrin saturation (Short & Domagalski, 2013). However, proper evaluation of IDA includes searching for potential causes of this condition, such as insufficient dietary iron intake or absorption, abnormal uterine bleeding or gastrointestinal bleeding (Short & Domagalski, 2013). Through the utilization and clinical practice-wide promotion of the proposed AAFP algorithm for the diagnosis of IDA by Short & Domagalski (2013), Nurse Practitioners can lead the way in encouraging their peers in proper evaluation and diagnosis of this population according to the most current evidence published by one of their top national practice organizations. Additional benefits will include reduced medical costs, decreased time to diagnosis, timely interventions, and optimal health and performance outcomes for our Air Force BMT female recruits (Fischer et al., 2016).

## **Organizing Framework**

The Reach Effectiveness Adoption Implementation Maintenance (RE-AIM) framework for planning and organization is the model that guided this project (Glasgow & Estabrook, 2018). During our literature review, authors of similar studies using an educational platform to implement a CPG employed the RE-AIM framework with positive and sustainable results (Quanbeck et al., 2018). Therefore, this model was found to be an effective, generalizable, and

evidence-based framework for translating research into practice, implementing an educational platform, optimizing provider adherence, and long-term sustainability.

The first component of the RE-AIM framework is Reach, which includes the intended population or audience (Gaglio, Shoup, & Glasgow, 2013). For our project, the intended population were the 18 Reid Clinic PCPs managing the healthcare of approximately 10,000 female BMT recruits. The Effectiveness (or efficacy) component is the impact of the intervention or program (Gaglio et al., 2013). By implementing the AAFP IDA algorithm, our project will establish a guideline for standardizing diagnosis and management of IDA among the PCPs; decrease inefficient, costly, and unnecessary diagnostic studies; lower provider and ancillary service workload; and reduce excessive follow-up appointments. The Adoption element is the proportion of the staff or population that agrees to initiate the intervention or changes (Gaglio et al., 2013). The percentage of Reid Clinic PCPs expected to adopt the AAFP algorithm is 11% or greater. The Implementation aspect relates to the actual adaptation of a policy or intervention (Gaglio et al., 2013; Glasgow & Estabrook, 2018). We garnered PCP and stakeholder support through an educational platform to include an evidence-based education platform composed of an interactive, provider-centered educational class, case studies, pre/post tests, handouts, staff meetings, project champions, and biweekly audit and feedback. Lastly, the Maintenance component is the sustainability of the policy or intervention (Gaglio et al., 2013). The identification of carefully selected permanent project champions, continuous audit and feedback, leadership and stakeholder engagement and support, local policy changes will bolster a sustainable culture of evidence-based practice and interventions (Appendix J).

## **Project Design**

### **General Approach**

PubMed, Embase, and Cumulative Index to Nursing and Allied Health Literature (CINAHL) were searched to identify articles or abstracts for inclusion in this literature review on research studies that studied tools that increased primary care provider adherence during the implementation of clinical practice guidelines or algorithms within an outpatient clinical setting. The PubMed search utilized the Medical Subject Heading (MeSH) terms: "clinical practice guideline" and "implementation" and "strategy" and "adherence." The algorithm used to retrieve the PubMed articles was: (("practice guideline"[Publication Type] OR "practice guidelines as topic"[MeSH Terms] OR "clinical practice guideline"[All Fields]) OR ("guideline" [Publication Type] OR "guidelines as topic" [MeSH Terms] OR "guideline" [All Fields])) AND implementation[All Fields] AND (strategy[All Fields] OR strategies[All Fields]) AND adherence[All Fields] AND ((Review[ptyp] OR Randomized Controlled Trial[ptyp] OR Meta-Analysis[ptyp] OR systematic[sb]) AND "2014/09/13"[PDat] : "2019/09/11"[PDat]). The Embase and CINAHL searches mirrored the PubMed search with database specific strings. The search was limited to articles published in English, peer-reviewed, and published within the last five years based on articles added to the databases through 11 September 2019. As of 11 September 2019, the total articles identified were 239. After 31 duplicate records were removed utilizing EndNote software, the remaining articles to evaluate were 208.

Titles and abstracts of these 208 articles were evaluated against inclusion and exclusion criteria in this review of the literature. Inclusion criteria focused on articles that included humans, any ethnic origin, primary care or outpatient clinical practice providers, and articles where meta-analysis, randomized control trials (RCTs), and systematic reviews were performed. Exclusion criteria were articles that included inpatient settings, only had an abstract, no clinical guideline was reviewed, and where the study was non-generalizable. After a review of the titles

and abstracts, 154 articles were excluded based on the inclusion and exclusion criteria. A total of 54 full-text articles were reviewed against inclusion and exclusion criteria, and this led to 38 articles being excluded. The remaining 16 articles were appraised by applying the appropriate Johns Hopkins Nursing Evidence-Based Practice (JHNEBP) Quality of Evidence Appraisal Tool to each article (Newhouse, Dearholt, Poe, Pugh, & White, 2005). The articles were then categorized and entered into a spreadsheet to allow for efficient comparison of study population, sample size, implementation tools, findings, limitations, and levels of evidence (Appendices G, I, and J).

## Quality.

The first step in analyzing the quality of articles included in a literature review is to determine the levels of evidence. The levels of evidence provide insight as to how a study may have been developed and conducted in order to prevent or decrease bias (LoBiondo-Wood & Haber, 2014). According to the Melnyk & Fineout-Overholt Hierarchy of Evidence Rating System (2011), 11 articles in the review are categorized as Level 1, Systematic Reviews or Meta-analysis of RCTs; three articles are considered Level 2, Well-designed RCTs; one article is Level 4, Well-designed Case Control or Cohort Studies, and one article is considered Level 5, Systematic Review of Descriptive and Qualitative Studies (Appendix I).

After determining the levels of evidence, the articles were assessed using the Johns Hopkins Nursing Evidence-Based Practice (JHNEBP) Quality of Evidence Appraisal Tool to each article that matched the type of study performed in the article (Newhouse et al., 2005). There were nine articles that were "high quality" of evidence, five articles that were of "good quality" of evidence, and two articles that were of "low quality" of evidence. The "high quality" articles were composed of studies that included a large sample size, a well-defined control group,

and had consistent, generalizable results based on a robust amount of scientific evidence (Newhouse et al., 2005). The "good quality" articles included studies that mostly had consistent results, a smaller sample size, a control group, but one where the researchers were unable to mitigate the effects of other variables, and had fairly consistent results with generalizable recommendations (Newhouse et al., 2015). The "low quality" article failed to demonstrate strong scientific evidence, the sample size was not defined, the search strategy was not explained, and the results, recommendations, and conclusions were vague (Appendix I) (Newhouse et al., 2005).

## Consistency.

The articles were consistent by addressing common barriers that prevent provider adherence to CPGs and simultaneously applied multiple implementation tools versus a single intervention. These tools often included an interactive, provider-centered educational class, case studies, pre/post-tests, handouts, staff meetings, project champions, and reoccurring individual audit and feedback (Appendices I and J). The inconsistencies among the articles were the difference in sample sizes, use of a well-defined control group, variety in interventions studied, and unclear results and recommendations (Appendix I).

### Synthesis.

The 16 articles consistently utilized an evidence-based educational platform to increase provider adherence to the implemented CPG or algorithm. The majority of the studies showed the highest increase in provider adherence when using multifaceted implementation strategies versus a single intervention. However, there is a moderate amount of heterogeneity noted in the literature concerning which specific implementation strategy is best.

Through the evidence appraisal, we learned that a single method intervention to implement CPGs is usually unsuccessful, and increasing provider adherence is most effectively gained through multiple strategies. In addition, studies successful at enhancing provider adherence used a needs assessment to identify gaps in organizational change and a nursing theory framework to understand the current organizational climate before the implementation stage. By understanding the successful interventions portrayed throughout the studies, we were able to thoroughly plan and mitigate potential risk factors that may be encountered during the implementation and maintenance phases of our project that may affect provider and leadership buy-in and project sustainability.

A limitation among the literature is that there is a lack of studies that specifically address the implementation of an CPG or algorithm for anemia. Regardless of the disease process, we had to review studies that implemented a guideline specifically for providers in a primary care setting whose research study design, results, and recommendations could be generalizable to our project and focus population. Therefore, generalizability was added to our inclusion criteria.

The lack of a specific theoretical nursing framework for the implementation of a multifaceted intervention strategy was another limitation among the research studies. The lack of a superior framework resulted in the adoption of the RE-AIM framework. The RE-AIM framework provides simple, evidence-based principles for incorporating evidence into practice, increasing provider adherence, and optimizing project sustainability.

In synthesizing the literature review, a number of strengths were identified. Nine articles that answered the clinical question were appraised to be of excellent quality. Additionally, studies consistently used a multifactorial approach in implementing guidelines to enhance provider adherence.

In summary, the aforementioned findings have led to the conclusion that a multifaceted educational-platform that includes active provider education, audit and feedback methods, and the incorporation of the RE-AIM framework is the best approach for improving provider adherence with the implementation of a standardized CPG algorithm (Appendix F).

## Setting

Healthcare operations and ancillary services associated with the project will occur at JBSA-Lackland's Reid Clinic, which is a Trainee Health Clinic that delivers outpatient healthcare services to over 86,000 USAF BMT recruits, as well as technical school, Defense Language, and international students (Air Force Medical Service, n.d.) in San Antonio, Texas. In addition to the Doctorate of Nursing Practice project members from the Uniformed Services University, the senior mentor, Dr. Janice Williams; the Phase II Site Director, Lieutenant Colonel Karla Dennard; the newly-recruited female Air Force Basic Trainees; the PCPs within the 559th Trainee Health Surveillance Flight; the Reid Clinic Medical Director, Dr. Francis Tran; the MTF administrative leadership within the 59th Medical Wing, and the 37th Training Wing leadership who oversee training operations at JBSA-Lackland (59th Medical Wing, n.d.).

### **Procedural Steps**

Our team's project was derived from discussions among stakeholders indicating a lack of standardization among Reid Clinic providers in their approach to diagnosing and managing ID/IDA among female BMT recruits. To verify there was a lack of standardization and to allow for comparative data, a three-month, systematic, retrospective chart review was conducted. The electronic records retrieved were only those that met specific inclusion criteria. The inclusion criteria consisted of females of reproductive age who were new military recruits that were assigned to providers at the RMC. The record must have had one of the following ICD-10 codes

included in conjunction with the above inclusion criteria to narrow the amount of medical records to review that would meet the aim of this project. The included ICD-10 were: D50.9 - Iron Deficiency Anemia, D50.8 - Other Iron Deficiency Anemias, D64.9 - Anemia Unspecified, E61.1 - Iron Deficiency, R53 - Malaise and Fatigue, R53.1 - Weakness, R53.82 - Chronic Fatigue, R53-83 - Fatigue, and R79.9 - Abnormal Findings on Blood Chemistry. Each record identified by the means above were individually screened using a systematic approach by two individuals to help eliminate bias and reduce error. Additionally, the identified records that were included for data extrapolation had to be the first/initial encounter for one of the ICD-10 codes above to reflect the appropriate use of the AAFP IDA algorithm.

Through the use of an evidence-based educational platform, our focus was to implement the AAFP algorithm for diagnosing and managing ID/IDA, increase diagnostic accuracy, and ultimately improve provider adherence. As previously discussed, the RE-AIM model/framework as described by Glasgow and Estabrooks (2018) was used to organize the team; craft a clinical question; and review, appraise, and synthesize the literature. To ensure the most up-to-date evidence was utilized, periodic literature reviews were conducted throughout each phase of the project.

According to White, Dudley-Brown, and Terhaar (2016), research shows that barriers traditionally result in a delay in daily application of evidence-based practices in healthcare. Prior to the project interventions, a three-month retrospective chart review and a needs assessment were performed to gather quantitative and qualitative data as well as confirm stakeholders' concerns on the PCPs' current practices, identify organizational limitations and barriers to change, developed mitigation strategies, and select change champions to bolster guideline adoption (Fischer et al., 2016). Overall, we were able to draw comparisons to the AAFP

algorithm, and developed an educational strategy to implement the AAFP algorithm guidance and improve provider adherence.

Next and somewhat concurrent with the previous step, we developed a provider-centered, interactive educational platform through the combination of literature review and coordination with the Reid Clinic Medical Director as to what would be most effective for gaining provider buy-in and receptive audit and feedback. In addition to previously identified barriers such as increased cost and time to educated providers, BMT recruit scheduling constraints, limited resources, lack of access to care, and lack of a standardized ID/IDA algorithm, we later found that the Reid clinic providers were operating under the assumption that there was a Command-level policy for diagnosing and managing anemia that did not exist. Through this failure in communication and misconception, there were unnecessary diagnostic studies, patients were not being adequately followed up or treated, patients were being placed in Medical Hold for an indeterminate amount of time affecting BMT mission and readiness. There continues to be a discrepancy among the guard and reserve BMT recruits based on guidance mandated from their respective leadership channels.

Following the implementation of our educational strategy, we obtained bi-weekly electronic record reports from the Group Practice Managers using the same inclusion criteria utilized for the retrospective chart review to compare and contrast the differences from pre/post-implementation and determine improvement in provider compliance. This data was used to audit providers' practice in relation to our project, provide appropriate feedback, and maintain an open line of communication with providers and leadership. Throughout the project, key stakeholders were given monthly briefings on adherence status, goal reinforcement, project start and end dates, ameliorated specific concerns and barriers, and maintaining an open line of

communication with the selected change-champions ensured buy-in and continued acceptance of the end goal (Appendix E).

## **Ethical and Legal Concerns**

Ethical principles of respect, beneficence, nonmaleficence, and justice will be maintained throughout our interaction with BMT recruits for the IDA Project at JBSA-Lackland (Dudley-Brown & Rushton, 2016). Respect for persons will occur by ensuring the privacy and confidentiality of medical information obtained from our recruits and adhering to the Health Insurance Portability and Accountability Act (HIPAA) regulations. Properly evaluating and diagnosing recruits with IDA according to an evidence-based guideline demonstrates the principle of beneficence, as early identification of the condition will allow for increased time for treatment and improved physical training results. We will promote nonmaleficence by avoiding unnecessary lab work and delays in diagnosis. Justice will be maintained, as all female recruits who present with signs and symptoms of anemia will be properly managed.

## **HIPAA Concerns**

The HIPAA Privacy Rule enacted as Public Law in 1996 was designed to enforce personnel who are involved in patient care or have access to patient records to maintain the privacy and security of patient information (Krager & Krager, 2018). HIPAA compliance is relevant to the IDA project, as our project involves reviewing medical records for the BMT recruits who are being evaluated for IDA. In order to prevent potential HIPAA breaches, personnel involved in the project have been mandated to complete HIPAA training through Joint Knowledge Online (JKO). Also, the Uniformed Services University students involved in the project have been involved in repeated discussions regarding best practices to prevent HIPAA infractions when dealing with physical and electronic health records. One practice to safeguard patient privacy

and confidentiality includes utilizing the Armed Forces Health Longitudinal Technology Application (AHLTA) and Composite Health Care System (CHCS) electronic health record systems to record information, as it requires a Common Access Card (CAC) and/or password for access to the government's network. Other interventions include the use of password-protected electronic folders to store data, HIPAA-approved procedural and drug code sets, HIPAA cover sheets and storing physical records in a locked containers when not in use, shredding unneeded physical records in federally-approved machines on site, and de-identifying personally identifiable information (PII) for data analysis through the use of DoD Identification Numbers (Blackman, 2018; Krager & Krager, 2018).

### Level of Review - Privacy Review Board

According to the Department of Defense Instruction (DoDI) 3216.02, if human subjects are incorporated into research, a full Institutional Review Board (IRB) approval is mandatory (DoD, 2011). Our project is not considered research, and we were not in direct contact with patient care. Rather, we conducted an evidence-based implementation project to evaluate how a provider-centered educational platform affects provider adherence to an IDA CPG algorithm for diagnosing and evaluating IDA. The individuals in the study were already being evaluated for anemia, and we were present to ensure they were diagnosed and managed according to the most up-to-date, evidence-based literature available. Overall, our project would require a Privacy Review Board as exempt research; to which, we will maintain HIPAA standards and de-identify all patient-data collected throughout the project (Appendix B and C).

### **Project Results**

After filtering electronic health records of reproductive-aged female BMTs with encounters for ICD-10 codes associated with a diagnosis or symptoms of anemia and/or ID, a

total of 170 charts were reviewed. Of the 170 charts, 127 met the inclusion criteria for data collection. Of the records that met inclusion criteria, there were 61 encounters that records could not be located based on original search methods and 66 encounters that were able to be fully reviewed. To date, the MTF system team was unable to determine why these records could not be identified with their record locator number; however, statistical analysis of the available records is enough to give adequate estimation of those encounters' data. Of the 66 reviewable encounters, 48 were Active Duty members and 18 were Guard or Reserve members. In comparing the three-month retrospective chart review data with three months' worth of post-implementation chart-audit data for diagnosing IDA among female BMT recruits, there was a 43.75% improved adherence rate with the AAFP algorithm among Reid Clinic providers. This surpassed our original goal of improving provider adherence by 11%.

Other noteworthy data are post-implementation hematologic study utilization rates. The largest change in laboratory studies was 43.75% as indicated by a decrease in orders for Reticulocyte Count and Occult Stool samples post the educational workshop. Additionally, there was a decrease in orders for Hemoglobin Electrophoresis by 37.5%, the most expensive lab among the available studies, costing \$135 per order. We noted a very small, 4% decrease in the use of serum iron and total iron binding capacity (TIBC) studies (Table D1-D3).

### **Analysis of Results**

This project was developed to determine if the use of an evidenced-based educational platform could improve provider adherence to the implementation of an evidence-based algorithm. After analyzing our results, the post-implementation provider improved adherence rate of 43.75%, exceeding the previously anticipated provider adherence rate of 11% found among similar studies during our literature review. Since there was a notable improvement in

provider adherence rate and a decrease in orders for hematologic studies not aligned with the AAFP algorithm, our clinical question was answered.

Based on budget analysis, this project revealed an estimated \$47,910.00 savings in diagnostic studies annually with the potential to save the clinic \$105,248.00 annually, if the AAFP algorithm is utilized appropriately by all providers for female AD, Guard, and Reserve trainees. These estimates are based on a comparison of diagnostic test usage during the three-month retrospective chart review prior to our implementation and data collected on the same diagnostic studies and utilization rates post-implementation. Cost for the studies was based on current pricing from LabCorp at the time this project implementation, as LabCorp is a primary laboratory utilized by the Air Force and their costs include some aspects of manpower and equipment to give a more accurate estimate.

There were several limitations noted for our project. First, our project was limited to three months of audit and feedback. At the one-month post educational workshop, we noted little change in provider adherence rate. Providers struggled with ordering only a serum ferritin level versus ordering an iron panel which consisted of serum iron, serum ferritin, and TIBC, as they were unaware they had the ability to order the single serum ferritin through the Electronic Health Record (EHR) when first evaluating for IDA as recommended by the algorithm. Even after receiving audits with feedback, providers still ordered an "Iron Panel" that consisted of a serum Iron, a TIBC, and a serum ferritin. There was a delay in data collection due to the time required to gather the charts that met criteria for our provider audits and in offering provider feedback due to the holiday season. Additionally, there was skepticism among the Reid Clinic providers in following the AAFP algorithm as they were initially under the assumption there was a Command-level policy mandating a specific set of orders for the evaluation and diagnosis of all

active duty anemic patients (H. Ortega, personal communication, January 9, 2020). Around two months post project implementation and open communication with the stakeholders and Reid Clinic providers confirming non-existence of a Command-level policy, there was a gradual rise in provider adherence rate, which strongly corresponds to the number of audit and feedbacks each provider received.

There were some important lessons learned throughout this project. In garnering support and eventual adoption of the AAFP algorithm by the Reid Clinic providers, individualized audit and feedback, Change Champions, and clinic leadership buy-in were crucial. Provider misconceptions were addressed, there were frequent reminders available, and providers felt more confident and supported in following the AAFP algorithm. Another lesson learned is that we failed to notice an improvement in provider adherence for those managing Guard and Reserve female trainees as they are governed under a policy mandating a specific set of diagnostic studies completed on any trainee diagnosed with anemia, unlike the active duty component. With an increased provider adherence rate to the AAFP algorithm versus previous clinical practice, we are confident that there was a decrease in misdiagnosis or delayed diagnosis for anemia among the target population.

#### **Organizational Impact**

The implementation of CPGs is integral in the execution of evidenced-based practice and are effective at creating a benchmark for audits, which is an essential part of continuous quality improvement (Fischer et al., 2016). According to Fischer et al. (2016), guidelines meet multiple purposes, such as to increase efficiency and quality of care, to decrease wide variation in clinical practice and prevent mistakes. Even with guidelines and clinical pathways readily available, about 30%-40% of patients receive treatment not based on scientific evidence, and 20%–25%

receive treatments that are either not needed or potentially harmful (Fisher et al., 2016). By implementing an effective strategic tool that increases adherence to the CPG, we can positively affect patient outcomes, and reduce unnecessary laboratory costs and unnecessary or harmful treatments.

One of the most obvious organizational impacts our project revealed is cost savings to the medical clinic and the DoD as a whole by reducing excess diagnostic studies while achieving the same outcomes for patients. We estimate a possible cost savings of up to \$105,248.00 for the clinic if they continue to follow the AAFP IDA algorithm. Additionally, the clinic should benefit from a decrease in provider workload. Although we did not collect data on the specific time savings or qualitative information from providers on how they felt about their workload post-implementation, it is assumed that with a reduction in diagnostic studies ordered, there will be a decrease in time required to review the results.

At a macro-organizational level, a critical concept from our project that applies to the future practice in the DHA healthcare system is that our project and results are very generalizable within military healthcare settings. Additionally, at the micro-organizational level, the educational workshop/platform in conjunction with an audit and feedback method involves little burden to a clinic to initiate, has a low-maintenance cost for a clinic, and can be individualized to almost any military primary care clinic setting. If DHA and/or other service branches adopt a similar method for educating and using the AAFP IDA algorithm for their BMT medical clinics, then hypothetically, there could be a potential annual savings to the entire healthcare system of nearly \$500,000.00 annually. The savings amount is a simple estimate based strictly off the values we discovered in our project and applying them liberally to the total number of female recruits across all services who are of childbearing age (Military OneSource,

2018). This is especially important as trends have statistically shown more and more women are entering the military and the ratio of women to men has continued to increase (Barroso, 2019). This is why we give a strong recommendation that this EBP project be utilized and applied across other military services' training environments, to include the National Guard and Reserves.

### **Future Directions for Research and Practice**

We recommend that more projects utilize the same or similar educational workshop and audit-feedback method in implementing CPGs or algorithms to benefit from an estimated annual cost savings of up to \$105,248.00, as shown in our project. Our first initiative is to update the active duty policy for managing IDA among the Air Force female BMT recruits. Next, we will engage the local guard and reserve leadership, streamlining the new policy and operational standardization with the active duty management of IDA. Additionally, the results and lessons learned from our project should be utilized and applied across other military training environments in all branches of service. Also, clinics should identify and maintain a Changechampion for sustainability of practice. Finally, as noted in our literature review demonstrating few diagnostic and evaluation algorithms available or tested, there is a strong need for researchers to conduct further studies into the effectiveness of various diagnostic algorithms and their associated outcomes.

### Conclusion

After reviewing and appraising the evidence-based research available, the data supported our PICOT question. Through the utilization of the RE-AIM framework, an educational platform was utilized to implement an evidence-based algorithm for the standardization of diagnosing and evaluating ID/IDA among female BMT recruits at the Reid Clinic. Throughout

the project, key stakeholders were given monthly briefings on adherence status; goals were reinforced; the project timeline was maintained; specific concerns, barriers, and limitations were addressed; and an open line of communication with the selected change-champions were continuously maintained for sustainability. Our results showed a 43.75% improved provider adherence rate to the AAFP algorithm, decreased lab utilization and provider workload, reduction in time to diagnosis and follow-up, and annual cost savings that may benefit the Reid Clinic and future military clinics globally.

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# Appendix A

# Collaborative Institutional Training Initiative (CITI) Certificates

Comption Date 28 Aug-287 Comption Date 27 Aug-2820 Record D	CITTI PROGRAM
This is to certify that:	This is to certify that:
Virginia Frazier	Virginia Frazier
Has completed the following CITI Program course:	Has completed the following CITI Program course:
Respinsible Conduct of Research (RCR) strumstum Groups Respinsible Conduct of Research (RCR) strumstumer Groups 1 · Basic Course	OUSD P&R Human Research Elumolum Group Biomedical Investigators and Research Study Team Elumolum Group 1 - Biomedical Investigators Otopp
Under requirements set by:	Under requirements set by:
Office of the Under Secretary of Defense (Personnel and Readiness) Calutorative Institutional Training Unitarive	Office of the Under Secretary of Defense (Personnel and Readiness) Cutobrative Institutional Training Instative
Verify at www.cliprogram.org/wrify/We0658c62-aab0-4701-9206-4610420a6bec-24356246	Verify at www.cliprogram.org/verify/1w6/97.tash-7046-4baa-8309-68195667bea2-24350245
CITTI PROCRAM	Completion Date 29 Aug 2017 Eproton Date 29 Aug 2017 Record ID Record ID
This is to certify that:	This is to certify that:
Melissa Everage	Melissa Everage
Has completed the following CITI Program course:	Has completed the following C/TI Program course:
Good Clinical Practice (U.S. FDA Focus) [Curriculum Group] GCP for Clinical Trials with Investigational Druzs and Medical Devices (U.S. (Curriculum Group)	OUSD P&R Human Research (Curriculum Group) Biomadical Investigators and Research Study Taxon (Curris Lances Group)
FDA Focus) 1 - GCP	1 - Basic Course
Under requirements set bic	Under requirements set by:
Calaborative Institutional Institutional Institutional Institutional Office of the Linder Conversion of Defence (Personnel and Readiness)	Office of the Under Secretary of Defense (Personnel and Readiness)
Verify at www.citiprogram.org/verify/?w262be5b2-6190-4ff2-bcbd-2610e6e7d93d-24345661	Verify at www.citiorogram.org/verify/7w1d00/606-16ba-4658-9598-582d27351372-34345660
Completion Date: 30-Aug-2017 Expression Date: 20-Aug-2017 Expression Date: 20-Aug-2017 Record ID	Completion Date 20-Aug-2017 Expraction Date 20-Aug-2017 Record ID
Nicholas Robertson	Nicholas Robertson
Has completed the following CITI Program course:	New exemplated the following PPB Reserves reverses
Good Clinical Practice (U.S. FDA Focus) Extractional Drugs and Medical Devices (U.S. increasing)	his comprete one norwing on Program course.
FDA Focus) 1 - GCP Gtapet	OUSD P&R Human Research (Curriculum Group) Biomedical Investigators and Research Study Team (Course Learner Group)
Under requirements set by:	1 - Basic Course Color
California future limiter Secretary of Defense (Personnel and Bradiness)	Under requirements set by:
Verify at www.ciciprogram.org/verify/?w04790684-9662-4243-bcf1-7/7b/59c7cd5-24297415	Office of the Under Secretary of Defense (Personnel and Readiness) in biology biology
	Verify at www.ctiprogram.org/verify?w10ae5b28/a41-4cae-8c2b-003ade242452-24297414
Completion Date 28-Aug-2017 Expiration Date 27-Aug-2020 Record ID	
This is to certify that:	
macriew simmons 1	
Has completed the following CITI Program course:	
OUSD P&R Human Research [Curriculum Group] Biomedical Investigators and Research Study Team (Course Learner Group)	
1 - Basic Course Okeri	
Under requirements set by:	
Office of the Under Secretary of Defense (Personnel and Readiness) of home interior	

## Appendix B

Uniformed Services University Form 3202N

#### USUHS FORM 3202N DANIEL K. INOUYE GRADUATE SCHOOL OF NURSING EVIDENCE-BASED PRACTICE/PERFORMANCE IMPROVEMENT PROPOSAL

VPR Date Stamp

Project Number:\_\_\_\_\_

## Project Title: Implementing an Evidenced-Based Algorithm for the Diagnosis and Evaluation of Iron Deficiency Anemia in Female Basic Military Training Recruits

(VPR will assign)

SECTION A: STU	DENT POC INFORMATION
1. Name (Last, First, MI): Robertson, Nicholas, P	Student E-mail; nicholas.robertson@usuhs.edu
2. Home Address	
SECTION B: COMMITTEE CH	IAIR / SENIOR MENTOR INFORMATION
3. Name (Last, First, MI): Williams, Janice	
4. Telephone: Fax:	E-mail: janice.williams@usuhs.edu
5. USUHS Building/ Room No.: Bldg E, Rm -	
SECTION C:	PROJECT INFORMATION
<ol> <li>Attach the Abstract for the proposal, including the followin Problem/Issue, Clinical Question/Purpose, Project Design include the Proposed Timeline. Single space the abstract at a statement of the proposed the proposed to the</li></ol>	ng sections: Site Location of the Project, Title, Authors, Background or Anticipated Organizational Impact/Implications for Practice and also and use Times New Roman font, size 12.
<ol> <li>Is this proposal related to an active research project of If yes, complete below; if no, proceed to Part 8. Project Number: Project Title:</li> </ol>	f the Chair/Senior Mentor identified in Section B? LYes 🛛 🖄 No
Project Start Date: Project	End Date:
8. Anticipated period of performance: Project Start D	ate: 10/15/2019 Project End Date: 3/15/2020
9. Performance Site(s): Joint-Base San Antonio-Lackland, Re	id Medical Clinic
10. Does this project involve any classified information	? (Contact the USUHS Security Office for guidance)  Yes XNo
11. Do you have a funding source for this project? If yes, specify the funding agency and the amount p	□Yes ⊠No □NA rovided:
SECTI	ON D: SIGNATURES
The following signatures attest to the validity of the above information:	
ROBERTSON.NICHOLAS.P.	WILLIAMS.JANICE.K.
Student (Project Point of Contact for the JOHNSON.HEATHER.L.	Chair/Senior Mentor (Signature and Date)
Chair/Program Director (Signature	and Date) Chair/Program Director (Signature and Date)
	SEIBERT.DIANE.C.
DNP Project Director or PhD Director (Signature	and Date) Associate Dean for Academic Affairs, GSN (Signature and Date)
WASSERMAN.JOAN.E.1	ROMANO.CAROL.A.
Associate Dean for Research, GSN (Signature a	nd Date) Dean, DKI Graduate School of Nursing (Signature and Date)
In light of the above signatures, the project is approved.	
USUHS Vice President for Research	Date

USUHS Form 3202N (VPR) - Revised Sep 2015 v1.2 Previous versions are obsolete

# Appendix C

# Military Treatment Facility Letter of Determination

	DEPARTMENT OF THE AIR FORCE 59TH MEDICAL WING (AETC) JOINT BASE SAN ANTONIO – LACKLAND TEXAS
	Nov 14, 2019
FINAL DETERM	<u>NATION -</u> NOT RESEARCH
Determination I	bate: 11/13/2019
<b>Project Lead:</b> Ni	cholas Robertson/USAF – 59th Medical Wing (59 MDW)
Reference Num	<u>er</u> : FWH20200012N
<u>Project Title</u> : Im Iron Deficiency	plementing an Evidenced-Based Algorithm for the Diagnosis and Evaluation of memia in Female Basic Military Training Recruits
You may begin y with the approv	our project, as you would any other clinical or operational activity, l and sponsorship of your leadership.
Your activity wa regulation <b>32</b> CI is not required. systematic inves designed to dev investigate the s	i determined on 13 Nov 19 to be considered <u>not research</u> as defined by DoD <b>R 219 and FDA regulation 21 CFR 56</b> . Continued IRB oversight for this activity The proposed activity is not funded by DHH5/DoD as research; is not a tigation to test a hypothesis and permit conclusions to be drawn; is not lop or contribute to generalizable knowledge; and the purpose is not to afety or effectiveness of a drug, medical device or biologic.
Since the IRB do responsibility to conduct of the s Should you requ study, please co responsibility fo commander.	is not have regulatory oversight for your study, it is the investigator's validate the study's scientific merit and research design and to ensure the udy is upheld by the highest ethical standards, as required by the Wing. ire assistance in reviewing the scientific merit and research design of your tact the Protocol Office. Protection of subjects' rights safety and welfare and c protecting PHI/PII and research data now fall on the investigator and their
In accord with D clinical investiga determination.	oDI 6000.08 any intramural funding of this study as research or as a tion may continue to be received or sought regardless of this IRB
Your study has project change o constitute huma may determine	eceived a one-time research determination. If the goals and/or activities of the uring the course of the project, or if new activities are proposed that would a subjects research, re-contact the Protocol Office, so that a regulatory expert whether or not the revised plan involves human subject research activities.
	Earl Grant, Jr., PhD Designated Exempt Reviewer

# Appendix D

# Other Project Documents

Table D1

Training Cost

A	В	С
BMT Trainee Cost	Calendar (24 Hr Day)	Training/Academic (8 Hr Day)
Course	\$ 25,423.65	\$ 25,423.65
Month	\$ 12,274.65	\$ 12,274.65
Week	\$ 2,824.85	\$ 2,824.85
Day	\$ 403.55	\$ 564.97
Hour	\$ 16.81	\$ 50.44
Minute	\$ 0.28	\$ 0.84
BMT Flight (48) Cost	Calendar (24 Hr Day)	Training/Academic (8 Hr Day)
Course	\$ 1,220,335.20	\$ 1,220,335.20
Month	\$ 589,183.00	\$ 589,183.00
Week	\$ 135,592.80	\$ 135,592.80
Day	\$ 19,370.40	\$ 27,118.56
Hour	\$ 807.10	\$ 3,389.82
Minute	\$ 13.45	\$ 56.50
BMT Accession Cost	Calendar (24 Hr Day)	Training/Academic (8 Hr Day)
Annual Accessions	36,131	36,131
Annual Cost	\$ 918,581,898.15	\$ 918,581,898.15
Day	\$ 14,580,665.05	\$ 20,412,931.07
Hour	\$ 607,527.71	\$ 2,551,616.38
Minute	\$ 10,125.46	\$ 42,526.94

# Appendix D (cont)

# Other Project Documents

## Table D2

# Pre Implementation Data Collection

Record Number	Date of Encounter	Compliant	Non-Compliant	СВС	Retic	Occult Stool	Electrophoresis	Iron	TIBC	Ferritin	Waiver Approved	Waiver Denied	Guard/Reserve	Active Duty
65078385	06/19/2019		x	x	x	x	x	x	x	x	x		x	
65078051	06/19/2019		x	x	x	x	x	x	x	x	x			
64960700	06/24/2019		x	x	x	×	x	x	x	x	x			x
65078554	06/25/2019		x	x	x	×	x	x	x	x	x			x
65143151	06/26/2019		×	x	×	~	v	~	×	~	~			×
65143400	06/26/2019		x	x	x	x	x	x	x	x	x			x
65143158	06/26/2019		x	x	x	x	x	x	x	x			x	
65155928	06/27/2019		x	x	x	x	x	x	x	x		x		x
65155965	06/27/2019		x	x	x	x	x	x	x	x	x			x
65155925	06/27/2019		x	x	x	x	x	x	x	x	x			x
65168823	06/28/2019		x	x			x	x	x	x	x			x
65168996	06/28/2019		×	×	×	×	×	×	×	×	×			×
65178664	06/28/2019		x	x			x	x	x	x	x			x
65182391	07/01/2019		x	x	x	x	x	x	x	x		x		x
65209214	07/03/2019		x	x	x	x	x	x	x	x	x			x
65227984	07/08/2019		x	x	x	×	x	x	x	x	x			x
65279324	07/11/2019		x	x	x	×	x	x	x	x	x			x
65282639	07/12/2019		x	×	x		x	x	x	x	x			x
65282619	07/12/2019		x	x	x	x	x	x	x	x	x			x
05202015	07/12/2013		<b>I</b> ^	<b>^</b>	1 <b>^</b>	<b>^</b>	^	^	^	^	^	1		<u></u>
65282619	07/12/2019		x	x	x	x	x	x	x	x	x			x
65325427	07/17/2019		x	x	x	x	x	x	x	x	x			x
65325263	07/17/2019		x	x	x	x	x	x	x	x	x			x
65338436	07/18/2019		x	x	x	x	x	x	x	x	x			x
65338598	07/19/2019	Presyncope	x	x	x	x	x	x	x	x		x		x
65352010	07/19/2019		x	x	x	x	x	x	x	x	x			x
65153951	07/22/2019		x	x	x	x		x	x	x	x			x
65377256	07/22/2019		x	x	x	x	x	x	x	x	x			x
65377392	07/22/2019		x	x	x	x	x	x	x	x	x			x
65377575	07/22/2019		x	x	x		x	x	x	x	x			x
65377653	07/22/2019		x	x	x	x	x	x	x	x	x			x
65379409	07/23/2019		x	x	x	x	x	x	x	x	x			x
65394311	07/24/2019		x	x	x	x	x	x	x	x	x			x
65393491	07/24/2019		x	x	x	x	x	x	x	x	x			x
65393498	07/24/2019		x	x	x	x	x	x	x	x	x			x
65393691	07/24/2019		x	x	x	x	x	x	x	x	x			x
65393964	07/24/2019		x	x	x	x	x	x	x	x	x			x
65152471	07/24/2019		x	x	x	x	x	x	x	x	x			x
65152397	07/24/2019		x	x	x	x	x	x	x	x	x			x
65393675	07/24/2019		x	x	x	x	x	x	x	x	x			x
-														
F=	i.	1										ň		
65406281	07/25/2019		x	x	x	x	x	x	x	x	x			x
65406350	07/25/2019		x	x	x	x	x	x	x	x	x			x
65173822	07/26/2019		x	x	x	x	x	x	x	x	×			×
65418502	07/26/2019		x	x	x	x	x	x	x	x	x			×
65418518	07/26/2019		×	×	×	x	x	x	x	x	×		×	×
65171962	07/26/2019		x	x	x	x	x	x	x	x	x		^	×
65183155	07/29/2019	t	x	x	x	x	x	x	x	x	×			x
65334427	07/29/2019	1	x	x	x	x	x	x	x	x	x			x
65270757	07/29/2019		x	x	x	x	x	x	x	x	x			x
65211182	07/29/2019	-	x	x	x	x	x	x	x	x	x			x
65454331	07/30/2019		x	x	x	x	x	x	x	x	x			x
65460649	07/31/2019		x	x	x	x	x	x	x	x	x			x
65210317	07/31/2019		x	x	x	x	x	x	x	x	×			x
65495078	08/02/2019		x	x	x	x	x	x	x	x	x			x
65495092	08/02/2019		x	x	X	X	X	x	X	X	x			X
65484445	08/02/2019	+	×	×	×	x	x	x	×	×	×			×
65484486	08/02/2019	1	x	x	x	x	x	x	x	x	x			x
65526273	08/07/2019		x	x	x	x	x	x	x	x	x			x
														1

65460479													
	08/07/2019	x	x		x	x	x	x	x	x	x		x
65520679	08/07/2019	x	×		x	x	x	x	x	x	x		x
65527126	08/07/2010	v			v	v	v	~	v	v	v	v	
05527130	08/07/2019	^	^^	-	^	^	^	^	^	^	^	^	
65541994	08/08/2019	x	x		x	x	x	x	x	x	x		x
65543592	08/08/2019	x	x		x	x		x	x	x	x		x
65545186	08/08/2019	×	×		x	x	x	×	×	x	x		x
655-15100	00/00/2015	^	^	-	~	~	^	^	^	~	^		^
65549189	08/09/2019	x	x		x	x	x	x	x	x	x		x
65394325	08/12/2019	x	x		x	x	x	x	x	x	x		x
65397791	08/12/2019	x	×		x	x	x	x	x	x	x		x
65401503	09/12/2010												
05401592	08/12/2019	x	x		x	x	x	x	x	x	x		x
65580434	08/12/2019	x	x		x	x	x	x	x	x	х		x
65580416	08/12/2019	x	x		x	x	x	x	x	x	x		x
65333307	08/12/2019	~	×		v	×	×	v	v	v	v		×
65555567	00/12/2015	^	^		~	~	^	^	^	~	^		^
65332365	08/12/2019	x	x		x	x	x	x	x	x	x		x
65585087	08/13/2019	x	x		x	x	x	x	x	x	x		x
65585058	08/13/2019	×	x		x		x	x	x	x	x		x
65599960	09/13/2010												
03388800	08/13/2019		^	-	^	^	^	^		^	^		^
65595632	08/14/2019	x	x		x	x	x	x	x	x	х		x
65595690	08/14/2019	×	x		x	x	x	x	x	x	x		x
65608234	08/15/2019	×	~		×	×	×	~	v	v	v		v
05000254	00/15/2015	1	^		^	^	^	^	^	^	^		^
65410208	08/16/2019	×	×		x	x	x	×	x	x	x		x
05410200	00/10/2015	^	^		^	^	^	Ŷ	^	^	^		^
65351795	08/16/2019	x	x		x	×	x	x	x	x	x	 	x
65621536	08/16/2019	x	x		x	x	x	x	x	x	x		x
65632652	08/19/2019	×	×		x	x	x	x	x	x	x		x
65052052	00/10/2010		- Î									1	
65418380	08/19/2019	x	x		x	x	x	x	x	x	x		x
65543720	08/19/2019	x	x		x	x	x	x	x	x	x		x
65633939	08/20/2019	x	x		x	x	x	x	x	x	x		x
65420070	09/21/2010				~			~					
05420970	06/21/2019	*	×		x	×	x	x	x	×	x	 	x
65660779	08/21/2019	x	x		x	x	x	x	x	x	x		x
65681918	08/22/2019	x	x		x	x	x	x	x	x	x		x
65685303	08/23/2019	v	~		~	~	v	v	v	~	×		×
05085505	00/25/2015	^	^		^	^	^	^	^	^	^		^
65695481	08/23/2019	x	x		x	x	x	x	x	x	x		x
65685508	08/23/2019	x	x		x	x	x	x	x	x	x		x
65699380	08/26/2019	×	x		x	x	x	×	x	x	x		x
65705400	00/20/2010												
65705128	08/26/2019	x	x		x	x	x	x	x	x	x		x
65506841	08/26/2019	x	x		x	x	x	x	x	x	x		x
65715570	08/27/2019	×	×		×	x	x	x	x	×	×		×
65712200	00/27/2010												
65/13289	08/2//2019	x	x		x	x	x	x	x	x	x		x
65715279	08/27/2019	x	х		х	x	x	x	x	x	x		x
65728066	08/28/2019	x	x		x	x	x	x	x	x	x		x
		1						1					
							1	1					
65728053					-								
	08/28/2019	x	x		x	x	x	x	x	x	x		x
65740879	08/28/2019	x	x		x x	x x	x	x x	x	x x	x x		x
65740879	08/28/2019 08/29/2019	x x	x x		x x	x x	x x	x x	x x	x x	x x		x x
65740879 65735756	08/28/2019 08/29/2019 08/29/2019	x x x	x x x		x x x	x x x	x x x	x x x	x x x	x x x	x x x		x x x
65740879 65735756 65736186	08/28/2019 08/29/2019 08/29/2019 09/03/2019	x x x x	x x x x x		x x x x	x x x x	x x x x	x x x x	x x x x	x x x x	x x x x		x x x x
65740879 65735756 65736186 65767354	08/28/2019 08/29/2019 08/29/2019 09/03/2019 09/03/2019	x x x x x x	x x x x x x		x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x x		x x x x x
65740879 65735756 65736186 65767354	08/28/2019 08/29/2019 08/29/2019 09/03/2019 09/03/2019	x x x x x	x x x x x x		x x x x x	x x x x x x	x x x x x x	x x x x x x	x x x x x x	x x x x x x	x x x x x x		x x x x x x
65740879 65735756 65736186 65767354 65792525	08/28/2019 08/29/2019 08/29/2019 09/03/2019 09/03/2019 09/03/2019	x x x x x x x x	x x x x x x x x		x x x x x x x	x x x x x x x x	x x x x x x x x	x x x x x x x	x x x x x x x	x x x x x x x	x x x x x x x x		x x x x x x x
65740879 65735756 65736186 65767354 65792525 65792661	08/28/2019 08/29/2019 08/29/2019 09/03/2019 09/03/2019 09/04/2019 09/04/2019	x x x x x x x x x x	x x x x x x x x x x x x x		x x x x x x x x x	x x x x x x x x x	x x x x x x x x x x	x x x x x x x x	x x x x x x x x	x x x x x x x x x	x x x x x x x x x x		x x x x x x x x x
65740879 65735756 65736186 65767354 65792525 65792661 65792676	08/28/2019 08/29/2019 08/29/2019 09/03/2019 09/03/2019 09/04/2019 09/04/2019 09/04/2019	x x x x x x x x x x x	x x x x x x x x x x x x		x x x x x x x x x x	x x x x x x x x x x x x x	x x x x x x	x x x x x x x x x x	x x x x x x x x x x	x x x x x x x x x x x	x x x x x x x x x x x x x x x		x x x x x x x x x x x
65740879 65735756 65736186 65767354 65792525 65792661 65792676	08/28/2019 08/29/2019 08/29/2019 09/03/2019 09/03/2019 09/04/2019 09/04/2019 09/04/2019	x x x x x x x x x x x x x x x x x x x	x x x x x x x x x x x x		x x x x x x x x x x x	x x x x x x x x x x x	x x x x x x x x x x x x x x x x x x x	x x x x x x x x x x	x x x x x x x x x x x	x x x x x x x x x x x	x x x x x x x x x x x x x x x x x x x		x x x x x x x x x x x x x
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# Table D3

# Post Implementation Data Collection

Practice Site:		Date of A	udit: Auditor													Guard/R	Active	Total \$
riactice site.		Date of A	Additi. Addition.				1						Extra			030140	Duty	Total 3
	Date of	Improved	Non-Compliant (please state at what point of the algorithm that they			Occult	Electrophore		TIBC	Ferritin	Number of Return	Number or type	procedures or studies	Annrove	Waiver			
Record Number	Encounter	Compliance	deviated)	CBC (\$28)	Retic (\$42)	Stool (\$74)	sis (\$135)	Iron (\$17.5)	(\$17.5)	(\$33)	Visits	of referrals	completed	d	Denied			
(No																		
Record)66839758	31-Dec-19		V Provider immediately deviated												L			
			by ordering all labs for initial									Gastroenterolog						
			review. All followup items, to									y (not in	EGD and	Inprogre				
66816339	27-Dec-19		include GI studies were not X -Provider immediately deviated	\$28.00	\$42.00	\$74.00	\$135.00	\$17.50	\$17.50	\$33.00	2	concurance with	colonoscopy	88	<u> </u>		x	\$347.00
			by ordering all labs for initial															
((7(2)))2	10 0 10		review. Not treated correctly with	620.00	6 40 00	674.00	6125.00	617.50	617.50	622.00				Inprogre	-			62.42.00
66/62182	18-Dec-19		X -Provider immediately deviated	\$28.00	\$42.00	\$/4.00	\$135.00	\$17.50	\$17.50	\$33.00	1	0	0	SS	-	x		\$347.00
			by ordering all labs for initial															
66750574	18-Dec-19		review. Not treated correctly with	\$28.00	\$42.00	\$74.00	\$135.00	\$17.50	\$17.50	\$33.00	1	0		In			v .	\$347.00
00757574	10-Dec-17		X -Provider immediately deviated	\$20.00	342.00	3/4.00	\$155.00	\$17.50	317.50	455.00		0		progress	-		^	#347.00
			by ordering all labs for initial											T				
66759861	18-Dec-19		abnormla findings of blood	\$28.00	\$42.00	\$74.00	\$135.00	\$17.50	\$17.50	\$33.00	3	1 nutrition	0	progress			x	\$347.00
66741220	18-Dec-19	1	unable to find;															
			X -Provider immediately deviated															
		x	by ordering all labs for initial											In				
66759687	18-Dec-19		review. Sickle cell trait.	\$28.00			\$135.00	\$17.50	\$17.50	\$33.00	3	0	0	progress	<u> </u>	-	x	\$231.00
			by ordering all labs for initial															
			review. G6PD "Other specified															
66759934	18-Dec-19		abnormal findings of blood X -Provider immediately deviated	\$28.00	\$42.00	\$74.00	\$135.00	\$17.50	\$17.50	\$33.00	4 (3 tcon)	0	(	)	+		x	\$347.00
			by ordering all labs for initial															
			review. G6PD "Other specified															
66760130	18-Dec-19	, 	abnormal findings of blood	\$28.00	\$42.00	\$74.00	\$135.00	\$17.50	\$17.50	\$33.00	0 6	1 pulm	2	2	+	x		\$347.00
66756574	18 Dec 10		unshis to find															
00730374	10-Dec-15		X -Provider immediately deviated												+			
			by ordering all labs for initial															
66765531	18-Dec-19		abnormla findings of blood	\$28.00	\$42.00	\$74.00	\$135.00	\$17.50	\$17.50	\$33.00				x			x	\$347.00
											1							
		x	X -Provider immediately deviated															
66759770	18-Dec-19		review. Sickle cell trait 06 DEC	\$28.00			\$135.00	\$17.50	\$17.50	\$33.00		0					x	\$231.00
66773074	19-Dec-19	•	unable to find; will look again															
			by ordering all labs for initial															
			review. G6PD (other specified															
66577338	20-Dec-19		abnormla findings of blood	\$28.00	\$42.00	\$74.00	\$135.00	\$17.50	S17.50	\$33.00		il 0	1	x	┼───	1	x	\$347.00
((70(17)	02 D 10		6-11															
66797907	23-1300-19		ionow up						1						<u> </u>	<u> </u>		
(guard) (other			X -Provider immediately deviated															
abnormal	23-Dec-19		by ordering all labs for initial review. G6PD	\$28.00	\$42.00	\$74.00	\$135.00	\$17.50	\$17.50	\$33.00						x		\$347.00
	20 000 10			<b>D</b>	0.2100		0100100								-	<u></u>		
66708017			X -Provider immediately deviated															
(reserve)	23-Dec-19		review. Sickle cell trait.	\$28.00	\$42.00	\$74.00	\$135.00	\$17.50	\$17.50	\$33.00	4	0		x			x	\$347.00
66701089	13-Dec-19		f/u 66693969															
66704400			X -Provider immediately deviated															
(workup began			by ordering all labs for initial											1				
prior to 22 Oct)	13-Dec-19		review.	\$28.00	\$42.00	\$74.00	\$135.00	\$17.50	\$17.50	\$33.00				x	—		x	\$347.00
			X -Provider immediately deviated											1				
			by ordering all labs for initial											1				
66519456	13-Dec-19		review. G6PD, hgb 9.1	\$28.00	\$42.00	\$74.00	\$135.00	\$17.50	\$17.50	\$33.00	3	0			<u> </u>	-	x	\$347.00
			X -Provider immediately deviated															
66602842	11-Day 10		by ordering all labs for initial	628.00	643.00	674.00	\$126.00	617.60	617.00	\$22.00							L.	\$247.00
00092842	1 11-1000-19	1	ILCYICW.	i \$20.00	i ⊅*#∠.00	1 \$/ <del>1</del> .00	a 3133.00	1 31/.30	n 01/.30	1 333.00	a 2	. 0		1.4	1	1	14	\$347.00

													b12, folate,				1	
			X -Provider immediately deviated										ESR, CRP,				1	
			by ordering all labs for initial										LDH,				1	
66693969	11-Dec-19		review. G6PD	\$28.00	\$42.00	\$74.00	\$135.00	\$17.50	\$17.50	\$33.00	6	Hematology	haptoglobin,	x		x		\$347.00
			X -Provider immediately deviated															
		x	by ordering all labs for initial														1	
		~	review. G6PD; Hgb 8. "other															
6693824 (guard)	11-Dec-19		specified abnormal findings of blood	\$28.00			\$135.00	\$17.50	\$17.50	\$33.00	3	0		х			х	\$231.00
																	1	
67236466	02/11/2020		unable to locate														1	
			X -Provider immediately deviated											Pt				
		v	by ordering all labs for initial											declined				
		~	review. G6PD; Hgb 89.3. "other											waiver				
67182275	02/11/2020		specified abnormal findings of blood	\$28.00				\$17.50	\$17.50	\$33.00	3	0	0	app			x	\$96.00
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67236400	02/11/2020		unable to locate													L		
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67248937	02/11/2020		unable to locate													<u> </u>		
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67214530	02/11/2020	-	lunable to locate									1						I
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67245272	2 02/11/2020		Reserve f/u				L			I		+				<u> </u>	<b>—</b>	
			A -Provider immediately deviated															
	1		by ordering all labs for initial												1 1			
			review. G6PD; Hgb 8. "other															
67078153	3 02/10/2020	0	specified abnormal findings of blood	\$28.00	\$42.00	\$74.00	\$135.00	\$17.50	\$17.50	\$33.00	3	0	1			<u> </u>	x	\$347.00
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6720502	5 02/07/2020	D	unable to locate													<u> </u>		
	1														1 1			
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67212414	4 02/07/2020	0	Unable to locate															
6721216	8 02/07/2020	0	Unable to locate												$\vdash$			
6719944	1 02/07/2020	0	Unable to locate													L		
	1														1 1			
			x-Flight physical n&n low; full															
6710657	1 02/06/2020		workup	\$28.00	\$42.00	\$74.00	\$135.00	\$17.50	\$17.50	\$33.00	3	0	1	x		x		\$347.00
	1		A -Provider immediately deviated												1 '			1
	1		by ordering all labs for initial										DOD IO 1		1 '			1
			review. G6PD; Hgb 8. "other										EGD/Colono		1			
6716298	6 02/06/202	1	specified abnormal findings of blood	\$28.00	\$42.00	\$74.00	\$135.00	\$17.50	\$17.50	\$33.00	4	I GI	scopy	x	<u>                                     </u>	—	x	\$347.00
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	1	1	v Elight physical h 8th Jones 6-11									1	ECD and	Bandie -	1 '	1		1
6710160	02/06/2020		washing with 1/2 angult start	620.00	642.00	674.00	6126.00	617.00	617.00	622.00		1.01	aalanasar	14 Eat	1 '	1	L. 1	6247.00
6/19166	/ 02/06/2020	J	workup with 1/3 occuit stool +	\$28.00	\$42.00	\$/4.00	\$135.00	\$17.50	\$17.50	\$35.00	4	101	colonoscopy	14 160	<u> </u> '	<b> </b>	x	\$347.00
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6712620	8 02/05/2022		Linable to locate									1		1	1 '	1	1 1	1
0/13030	02/03/202	-	X -Provider immediately deviated	<u> </u>										+	H'	<u> </u>	<u> </u>	1
	1	1	by ordering all labs for initial									1	1	1	1 '	1		1
67179204	1	1	review G6PD "other specified									1	1	Pending	1 '	1		1
(11/3204	02/05/2020		abnormal findings of blood	628.00	\$42.00	\$74.00	\$125.00	\$17.50	\$17.50	622.00		1		2/26	1 '	L	1 1	\$247.00
(ICSCIVE)	02/03/202	-	aonormai mungs of blood	\$28.00	\$42.00	\$74.00	\$133.00	\$17.30	\$17.30	333.00				2120	<u> </u>	<u>^</u>	<u> </u>	ə547.00
1	1	1										1		1	1 '	1	1 1	1
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6712979	02/05/202		unship to locate									1	1	1	1 '	1		1
0/13868	2 02/03/202	-	X -Provider immediately deviated											1	<u> </u>	<u> </u>	+	1
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(7100 17	02/05/000		abnormal finding fil	600.00	640.00	674.00	6136.00	617.60	617.00	622.00					. '	1	2	6247.00
6/180472	21 02/05/2020	UI III	abnormal findings of blood	\$28.00	\$42.00	\$74.00	\$135.00	\$17.50	\$17.50	\$55.00	1 1	. 0	1	1 0	1 1	1	X	\$547.00

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67179252	02/05/2020	x	x-low hemoglobin then CBC plus iron panel	\$28.00				\$17.50	\$17.50	\$33.00	1	0		Pending 2/26		x	\$96.00
67187501	02/05/2020		undela ta la asta														
67178474	02/05/2020		inable to locate														
(reserve)	02/05/2020	G6PD Semen	Low hemoglobin G6PD screen													+	
67179258 (guard)	02/05/2020	Secon	iron panel "abnormal results of function studies	\$28.00	\$42.00	\$74.00	\$135.00	\$17.50	\$17.50	\$33.00	3	0		Pending		x	\$347.00
67140611	02/04/2020		of other organs and systems" 19 DECfull workup by J. Brown I/u from 08 Dec "other abnormal findings of blood chemistry" heme								2				_		
67166570	02/04/2020		onc consult from hereditary spherocytosis											x		x	
67049289	02/04/2020		f/u from 23 DEC, SCT			1											
67138625	02/03/2020		unable to locate														
67094002	02/03/2020		unable to locate														
(7)22286	02/02/2020																
67132286	02/03/2020		unable to locate														
No Record)66839	31-Dec-19																
66816339	27-Dec-19		X -Provider immediately deviated by	\$28.00	\$42.00	\$74.00	\$135.00	\$17.50	\$17.50	\$33.00	2	1 - Gastroenterol	EGD and cold	Inprogress		x	\$347.00
66762182	18-Dec-19		X -Provider immediately deviated by	\$28.00	\$42.00	\$74.00	\$135.00	\$17.50	\$17.50	\$33.00	1	0	0	Inprogress		x	\$347.00
66759574	18-Dec-19		X -Provider immediately deviated by	\$28.00	\$42.00	\$74.00	\$135.00	\$17.50	\$17.50	\$33.00	1	0	0	In progress	x		\$347.00
(No Record)6685	4 3-Jan-20																
		Coulter															
	17-Dec-19																
(No Record)6692	2473																
(No Record)6691	1735	~															-
66874218	9-Jan-20		X - Provider ordered entire iron pane	\$28.00				\$17.50	\$17.50	\$33.00	2	0	a			x	\$96.00
(No Record)6693	7803																
(No Record)6693	7805															-	
66925817 (referer	n 10-Jan-20		X - Provider immediately deciated by	\$28.00	\$42.00	\$74.00	\$135.00	\$17.50	\$17.50	\$33.00	3	0	0			x	\$347.00
66928060 (Refere	10-Jan-20		X - Provider immediately deciated by	\$28.00	\$42.00	\$74.00	\$135.00	\$17.50	\$17.50	\$33.00	3	0	0			x	\$347.00
66927938 (referen	n 10-Jan-20		X - Provider immediately deciated by	\$28.00	\$42.00	\$74.00	\$135.00	\$17.50	\$17.50	\$33.00	3	0	0		x		\$347.00
(No Record)6683	31-Dec-19																
			V Davida investigation	P20.57					p10.00				FCD - 1				63.47.57

66762182	18-Dec-19		X -Provider immediately deviated by	\$28.00	\$42.00	\$74.00	\$135.00	\$17.50	\$17.50	\$33.00	1	0		) Inprogress		x		\$347.00
66759574	18-Dec-19		X -Provider immediately deviated by	\$28.00	\$42.00	\$74.00	\$135.00	\$17.50	\$17.50	\$33.00	1	0		In progress	s x	-	_	\$347.00
(No Record)66854	4 3-Jan-20															+		
		Coulter																
<u> </u>	17-Dec-19														+	+	$\neg$	
(No Record)6692	2473																	
(No Record)66011	1735																	
(140 Record)06911		x								<u> </u>						+		
66874218	9-Jan-20	~	X - Provider ordered entire iron panel	\$28.00				\$17.50	\$17.50	\$33.00	2	0	0			x		\$96.00
(No Record)66937	7803																	
(No Record)66937	7805																_	
66925817 (referen	10-Jan-20		X - Provider immediately deciated by	\$28.00	\$42.00	\$74.00	\$135.00	\$17.50	\$17.50	\$33.00	3	0				x		\$347.00
,																		
66928060 (Refere	10-Jan-20		X - Provider immediately deciated by	\$28.00	\$42.00	\$74.00	\$135.00	\$17.50	\$17.50	\$33.00	3	0	0		x	+	-	\$347.00
66927938 (referen	10-Jan-20		X - Provider immediately deciated by	\$28.00	\$42.00	\$74.00	\$135.00	\$17.50	\$17.50	\$33.00	3	0	c			x		\$347.00
															T	T		
66925906 (Refere	10-Jan-20		X - Provider immediately deciated by	\$28.00	\$42.00	\$74.00	\$135.00	\$17.50	\$17.50	\$33.00	3	0			x		_	\$347.00
66873039 (Refere	nce appt on	x	X - Provider with anemia on CBC. F	\$28.00				\$17.50	\$17.50	\$33.00	3	0				x		\$96.00
66948211(No Rec	13-Jan-20																-	
66765254 (Refere	14-Jan-20		X - Provider initally ordered iron par	\$28.00	\$42.00	\$74.00	\$135.00	\$17.50	\$17.50	\$33.00	4	0				x		\$347.00
66799035 (Refere	15-Jan-20		X - Provider initally ordered iron pan	\$28.00	\$42.00	\$74.00	\$135.00	\$17.50	\$17.50	\$33.00	3	0			x		-	\$347.00
66972059	15-Jan-20		X - Provider initally ordered iron pan	\$28.00	\$42.00	\$74.00	\$135.00	\$17.50	\$17.50	\$33.00	2	0				x		\$347.00
66989157 (No Re	16-Jan-20	1																I
66989127 (No Re	17-Jan-20																	
( <b>1</b> 0) (0) (0) (0) (0)																		
0/014948 (No Re	21-Jan-20	v														+		
66990294	13-Jan-20	~	X - Sports medicine provider initially	\$28.00				\$17.50	\$17.50	\$33.00	2	. c		D	X (pt did no	t reque X	:	\$96.00
			V. Duralda inconstruction for the	600.00					617.00	ena co								63 17 00
	5-Feb-20		A - Provider immediately deviated ar	\$28.00	\$42.00	\$74.00	\$135.00	\$17.50	\$17.50	\$33.00	2	. 0		U	X	+		\$347.00
67179258	5-Feb-20		X - Provider immediately deviated an	\$28.00	\$42.00	\$74.00	\$135.00	\$17.50	\$17.50	\$33.00	2			D	x			\$347.00
(7170201	S F-L AA		V. Denuidae immediatele deni i d	\$20.00	640.00	P74 00	6132.00	817.00	\$17 CO	633.00								\$247.00
67179204	5-Feb-20		- Provider immediately deviated an	\$28.00	\$42.00	\$/4.00	\$135.00	\$17.50	\$17.50	\$33.00	2	. 0			X	+		\$347.00
67044122 (no reco	22-Jan-20																	

67052256 (no rece	23-Feb-20															<u> </u>		
66973037 (f/u app	23-Jan-20	x	X- Provider ordered entire iron panel	\$28.00				\$17.50	\$17.50	\$33.00	) 4	4 (	) (	D		<u> </u>	x	\$96.00
67051701 (No Re	23-Jan-20																	
(7050022	24 1 21		V. Descrides and and all lake . Down	678.00	642.00	674.00	\$125.00	617.50	\$17.50	622.00				0.01-4	4-41	4	v	6247.00
67039033	24-Jan-20	x	X - Provider ordered all laos Even	\$28.00	\$42.00	\$74.00	\$155.00	\$17.50	\$17.50	\$35.00	/ <u> </u>	, (		/ Not need	ied, resor	vea	<u>^</u>	\$347.00
67059502	24-Jan-20		X - Provider ordered iron panel instea	\$28.00				\$17.50	\$17.50	\$33.00	4	1 (		0 Not need	ied, resolu	ved	x	\$96.00
67013639	24-Jan-20		X - This is a f/u appt from initial diag	\$28.00				\$17.50	\$17.50	\$33.00	) 3	3 (		) x		<u> </u>	x	\$96.00
67059534	24-Jan-20	x	X - Provider ordered entire iron pane	\$28.00				\$17.50	\$17.50	\$33.00	3	š -	_		x		x	\$96.00
		x																
67058939	24-Jan-20	0	X - Provider orderd full iron panel.	\$28.00				\$17.50	\$17.50	\$33.00	2	e 0		)?	<u> </u>		x	\$96.00
67059525	24-Jan-20	D	X - Provider deviated on all accounts	\$28.00	\$42.00	\$74.00	\$135.00	\$17.50	\$17.50	\$33.00	3			Awaiting	ŝ	x		\$347.00
67074296	27 Jan 20	x	X - Provider ordered full iron panel; I	\$28.00				\$17.50	\$17.50	\$33.00	3	а с		) Not need	led		x	\$96.00
67103633 (No Re	28 Jan 20	D																
67103617 (No Re	28 Jan 20	D													<u> </u>			
67103625 (No Re	28 Jan 20	D																
67103676 (No Re	28 Jan 20																	
67195182 (No Re	12 Feb 20	þ														<u> </u>		
67193270 (No Re	12 Feb 20	0																
		x																
67251785 (referen	12 Feb 20		X - Provider ordered iron panel inste	\$28.00				\$17.50	\$17.50	\$33.00	2	2 (		) Awaiting	1	-	x	\$96.00
67268273 (No Re	13 Feb 20	)												+		<u> </u>		
67246388 (no rec	c 14 Feb 20	)																
		x																
67275912	2 Mar 2	D	provider ordered only ferritin, cleared	\$28.00						\$33.00	) 3	8 (		None nee	eded		x	\$61.00
67304142	19 Feb 20	þ	X- Provider ordered all labs	\$28.00	\$42.00	\$74.00	\$135.00	\$17.50	\$17.50	\$33.00	3		) (		 	x		\$347.00
67305091 (no rec	19 Feb 20																	
		x																
67332782 (see rec	21 Feb 20		X - Provider ordered full panel	\$28.00				\$17.50	\$17.50	\$33.00	4	0	0 0	None nee	eded		x	\$96.00
67288543	21 Feb 20		X- Provider ordered everything	\$28.00	\$42.00	\$74.00	\$135.00	\$17.50	\$17.50	\$33.00	3	. o	c	x	<u> </u>	x		\$347.00
67260105 (referer	4 Mar 24	x	X - Provider utilized only ferritin and	\$28.00						\$33.00							x	\$61.00
(contra										220.00								221.00
67363540	25 Feb 20		X - Provider immediately deviated or	\$28.00	\$42.00	\$74.00	\$135.00	\$17.50	\$17.50	\$33.00	1	1 (Hem)	0	Unknow	n	$\vdash$	x	\$347.00
67363454	25 Feb 20	x	X - PRovider ordered full panel	\$28.00				\$17.50	\$17.50	\$33.00	1	0		Unknown	n		x	\$96.00
67295375 (No Re	25 Feb 20																	

c10000         33.06.20         X         X         Non-start full and         13.00         11.700         13.00         1         0         Usaccon         30         90.00           Toti         20         12.46.00         13.00.00         54.00.00         13.120.00         51.70.00         23.100.00         10         0         0																		
Construction         Construction<	67363463	25 Eab 20	x	Y - Provider ordered full penal	\$28.00				\$17.50	\$17.50	\$33.00	1	0	Unl	nown		v	\$96.00
Ted         2         SLARDE	07505405	25 160 20		A - Flovider ofdered full panel	\$28.00				\$17.50	317.50	355.00	 1						\$90.00
Test I Did Reserver         127	Total		2		\$1,848.00	\$1,890.00	\$3,330.00	\$6,480.00	\$1,120.00	\$1,120.00	\$2,178.00						18 4	18 \$17.966.00
Test # Beaution         137	100		2			•1,070100	00,000100	00,100100	01,120.00	01,120.00	02,170.00						10	\$17,500100
Tail # Domain         127         <																		
Tail # Boosseen         12 <th12< th="">         12         12</th12<>																		
Trail # Execution         12																		
Tail Honomin         12																		
Table Medice         Image of the state of the stat	Total # Encounter	s			127	127	127	127	127	127	127							
Tail I bh       6       6       6       6       6       6       6       6         Tail I Di Foontes       66	Total # Encounter				127	127	127	127	12/	127								
Tail # Ma         66         45         45         46         60         66																		
Total # Jah         66         65         64         65         66         66           Total # Jah         66 <td></td>																		
Image and intervention         Image intervention         Ima	Total # labs				66	45	45	49	65	65	66							
Tadal # IDA Encountern         66<	Total # labs	!	!		<u>i</u> 00	i 45	45	40	1 05		<u>i</u> 00	 !		!		!	ļ	
Teal # ID4 Executes         66 <td></td>																		
Trul # 104 Excenters         66 <td></td>																		
Tetal # ID flacounters         66<																		
Total # AD         48         27         27         30         46         46         48           Cost stali for AD         51,34.00         \$1,94.00         \$1,94.00         \$1,94.00         \$1,94.00         \$1,990.00         \$805.00         \$1,54.00         \$11,720.00           Cost stali for AD         \$1,34.00         \$1,940.00         \$1,940.00         \$1,940.00         \$10,00         \$805.00         \$1,540.00         \$11,720.00           from         recogective         recogective         \$1,340.00         \$1,940.00         \$1,940.00         \$100.00         \$805.00         \$1,540.00         \$11,720.00           from         recogective         recogective         \$1,340.00         \$1,940.00         \$100.00         \$300.00         \$100.00         \$4,026.00           Total # GulRes         18	Total # ID'd Enco	unters			66	66	66	66	66	66	66							
Total # AD         48         27         27         30         46         46         48           Cost total for AD         \$1,344.00         \$1,134.00         \$1,998.00         \$4,650.00         \$805.00         \$1,540.00         \$11,720.00           Cost total for AD         \$1,344.00         \$1,134.00         \$1,998.00         \$4,650.00         \$805.00         \$1,540.00         \$11,720.00           from retrospective retrospective retrospective         \$0.00         \$842.00         \$1,540.00         \$2,000.0         \$0.00         \$4295.00           Total # Gel/Res         18         18         18         18         18         18         18         18           Cost total for Gel/Res         \$504.00         \$756.00         \$1,332.00         \$2,400.00         \$315.00         \$594.00         \$62,246.00           Cost total for Gel/Res         \$504.00         \$756.00         \$1,332.00         \$2,400.00         \$315.00         \$594.00         \$62,246.00           Cost total for Gel/Res         \$0.00         \$0.00         \$0.00         \$0.00         \$0.00         \$0.00         \$0.00         \$0.00         \$0.00         \$0.00         \$0.00         \$0.00         \$0.00         \$0.00         \$0.00         \$0.00         \$0.00																		
Total # AD         48         27         27         30         46         46         48           Cot total for AD         \$1,344.00         \$1,134.00         \$1,988.00         \$4050.00         \$805.00         \$1,584.00         \$11,720.00           Cost total for AD         \$0.00         \$882.00         \$1,594.00         \$10,000         \$805.00         \$1,584.00         \$11,720.00           Trougestive         revoyee for AD         \$0.00         \$882.00         \$1,554.00         \$2,400.00         \$0.00         \$0.00         \$40,256.00           Total # Ged/Res         18         18         18         18         18         18         18         18           Cost total for Ged/Res         500.00         \$1,320.00         \$131.00         \$315.00         \$315.00         \$594.00         \$594.00         \$594.00         \$504.00         \$500.00         \$50																		
Tend # AD         48         27         27         30         46         46         48           Cost tend for AD         \$1,344.00         \$1,134.00         \$1,998.00         \$4,050.00         \$805.00         \$1,554.00         \$1,1720.00           Sta svings         from         retrospective         \$0.00         \$882.00         \$1,554.00         \$30.00         \$30.00         \$30.00         \$30.00         \$4,026.00           Total # Ged/Res         \$0.00         \$882.00         \$1,554.00         \$31.00         \$30.00         \$30.00         \$30.00         \$4,026.00           Total # Ged/Res         18         18         18         18         18         18         18           Cost tend for Ged/Res         \$594.00         \$756.00         \$1,332.00         \$2,400.00         \$315.00         \$315.00         \$594.00         \$6,246.00           Cost tend for Ged/Res         \$594.00         \$756.00         \$1,332.00         \$2,400.00         \$315.00         \$594.00         \$6,246.00           Cost tend for Ged/Res         \$504.00         \$576.00         \$1,332.00         \$2,400.00         \$315.00         \$315.00         \$30.00         \$6,246.00           Cost tend for Ged/Res         \$504.00         \$576.00         \$																		
Cost total for AD         S1,344.00         S1,344.00         S1,998.00         S4,050.00         S805.00         S1,584.00         S11,720.00           from         Trotopedito         30.00         \$882.00         \$1,554.00         \$2,430.00         \$30.00         \$30.00         \$30.00         \$4,052.00         \$4,050.00         \$30.00         \$30.00         \$30.00         \$4,052.00         \$1,720.00         \$4,050.00         \$30.00         \$30.00         \$30.00         \$4,052.00         \$4,052.00         \$4,052.00         \$4,050.00         \$30.00         \$30.00         \$50.00         \$4,052.00         \$4,052.00         \$4,052.00         \$4,052.00         \$4,052.00         \$4,050.00         \$4,050.00         \$50.00	Total # AD				48	27	27	30	46	46	48							
Cost total for AD         \$1,344.00         \$1,980.00         \$4,050.00         \$805.00         \$1,84.00         \$11,720.00           from review for AD         \$0.00         \$882.00         \$1,554.00         \$2,430.00         \$30.00         \$0.00         \$40.00         \$40.00         \$1,980.00         \$40.00         \$1,980.00         \$1,980.00         \$1,980.00         \$1,980.00         \$1,980.00         \$10.00         \$10.00         \$11,720.00         \$10.00																		
Cost total for AD         S1,344.00         S1,344.00         S1,998.00         S4,050.00         S805.00         S1,584.00         S1,584.00         S11,720.00           Cost strings         retrospective         retrospective         s000         S805.00         S1,054.00         S10,00         S40,000																		
Cost total for AD         S1,344.00         S1,998.00         S4,050.00         S805.00         S805.00         S1,584.00         S11,720.00           Cost savings         retrospective         retrospective         s0.00         S882.00         S1,584.00         S10.00         S10.00 </td <td></td>																		
from terospective review for AD  S0.00  S82.00  S1,554.00  S2,430.00  S30.00  S0.00  S0.00  S4,926.00  S4,926.00 S4,926.00 S4,926.00 S4,926.0	Cost total for AD Cost savings				\$1,344.00	\$1,134.00	\$1,998.00	\$4,050.00	\$805.00	\$805.00	\$1,584.00							\$11,720.00
review for AD         \$0.00         \$882.00         \$1,554.00         \$2,430.00         \$30.00         \$30.00         \$30.00         \$4,926.00           Total # Grd/Res         18 <td< td=""><td>from retrospective</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></td<>	from retrospective																	
Total # Grd/Res         18	review for AD				\$0.00	\$882.00	\$1,554.00	\$2,430.00	\$30.00	\$30.00	\$0.00							\$4,926.00
Total # Grd/Res         18																		
Cost total for Grd/Res         \$504.00         \$756.00         \$1,332.00         \$2,430.00         \$315.00         \$594.00         \$6,246.00           Cost strings         from         restrospective         \$0.00         <	Total # Grd/Res				18	18	18	18	18	18	8 18							
Cost total for Grd/Res         \$504.00         \$756.00         \$1,332.00         \$2,430.00         \$315.00         \$594.00         \$6,246.00           Cost savings         from         restrospective         \$0.00         <																		
Cost total for Grd/Res         \$504.00         \$756.00         \$1,332.00         \$2,430.00         \$315.00         \$594.00         \$6,240.00         \$6,000         \$6,000         \$6,000         \$6,000         \$6,000         \$6,000         \$6,000         \$6,000         \$6,000         \$6,000         \$6,000         \$6,000         \$6,000         \$6,000         \$6,000 </td <td></td>																		
Cost swings         Cost swings <thcost swingswings<="" th="">         Cost swings</thcost>	Cost total for Grid	/Res			\$504.00	\$756.00	\$1.332.00	\$2,430.00	\$315.00	\$315.00	\$594.00							\$6,246.00
Instrumentative         S0.00	Cost savings from				0001100	0100100	01,000,000	02,150100	0010100	0010100	0001100							001210100
Percent Change in utilization for AD         0.00% ↓ 43.75%         ↓ 43.75%         ↓ 4%         ↓ 4%         0.00%           Potential Savings for GR based on results         \$0.00         \$330.00         \$582.00         \$911.00         \$13.00         \$13.00         \$0.00           Percent Change         \$0.00         \$330.00         \$582.00         \$911.00         \$13.00 </td <td>restrospective review for G/R</td> <td></td> <td></td> <td></td> <td>\$0.00</td> <td>\$0.00</td> <td>\$0.00</td> <td>\$0.00</td> <td>\$0.00</td> <td>\$0.00</td> <td><u>\$0.00</u></td> <td> </td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>\$0.00</td>	restrospective review for G/R				\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	<u>\$0.00</u>	 						\$0.00
In utilization for <u>AD</u> 0.00% ↓ 43.75% ↓ 43.75% ↓ 4% ↓ 4% 0.00% Potential Savings for G/R based on results S0.00 \$330.00 \$582.00 \$911.00 \$13.00 \$13.00 \$0.00 Percent Change	Percent Change																	
Potential Savings for G/R based on results         \$0.00         \$330.00         \$582.00         \$911.00         \$13.00         \$0.00         \$13.49.00           Percent Change         Image: Change State Stat	in utilization for AD				0.00%	↓ 43.75%	↓ 43.75%	↓ 37.5%	↓4%	↓ 4%	0.00%							
Status         \$0.00         \$330.00         \$582.00         \$13.00         \$13.00         \$0.00         \$1,849.00           Percent Change               \$1,849.00	Potential Savings																	
Percent Change	results				\$0.00	\$330.00	\$582.00	\$911.00	\$13.00	\$13.00	\$0.00							\$1,849.00
in utilization for	Percent Change in utilization for																	

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Estimate annual savings = \$25,000 at current practice for only AD using only identified records	Estimated annual savings for g/r if adopted using only identified records= \$7,400	F s s a a f s s s s s s s s s s s s s s s	Estimated avings if accouting by erecentage of inilocateabl records accomplish d by aking inilocatable ecords and unilocatable ecords and upplying he records are inilocateable ecords and upplying he records are inilocateable ecords and upplying he he records are inilocateable ecords and inilocatable ecords and inilocatable ecords that re active het inilocateable i		Estimated asvings if accouting for percentage of unlocateable records for G/R (accomplish ed by taking unlocatable records and applying the percentage percentage of active records and are G/R to total number. This equals ~17 G/R of the 61		Total estimated savings based on current results if applied to both AD annually = \$62,292.00		Total estimated savings based on current results if applied to only AD annually = \$47,910		Total cost savings between retrospective chart review and present if all providers followed AAFP algorithm correctly for AD = \$105,248
	Total est AD using all labs for 90 day \$	2,576.00	\$3,864.00	\$6,808.00	\$12,420.00	\$1,610.00	\$1,610.00	\$3,036.00		\$31,924.00	
	Total est AD using AAFP for 90 days \$	2,576.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$3,036.00		\$5,612.00	
	Difference/Savings	\$0.00	\$3,864.00	\$6,808.00	\$12,420.00	\$1,610.00	\$1,610.00	\$0.00		\$26,312.00	
	Total savings annually if following AAFP Algorithm									\$105,248.00	
	Estimated overall provider improved compliance rate (21 of 48 encounters showed improved	43.75%									
	Estimate annual savings = \$25,000 at current practice for only AD using only identified records	Estimate Estimated annual savings for g/r if adopted using only identified records= \$7,400 \$25,000 at current practice for only AD using only identified records= \$7,400 \$200 \$200 \$200 \$200 \$200 \$200 \$200 \$	Estimate Estimated annual savings for g/r if adopted using only identified records= \$7,400 \$25,000 at a records= \$7,400 \$25,000	Estimate annual savings = 525,000 at current practice for only AD using only identified       Estimated adopted using only identified       Estimated savings if accounting for only AD using only identified         records       57,400       adopted using only identified         uurent practice for only AD using only identified       uncertable records       adopted using only identified         records       for AD (cocomplish ed by unlocatable records and applying the percentage of active duty to total number.       stang adopted using all labs for 90 day \$2,576.00       \$3,864.00         Total est AD using all labs for 90 day AAFP Algorithm       \$2,576.00       \$3,864.00         Total est AD using all labs for 90 day AAFP Algorithm       \$2,576.00       \$3,864.00         Estimated overall provider improved compliance rate (21 of 48 encounters showed improved additional compliance rate (21 of 48       \$43,75%	Estimate annual savings = S25,000 at current practice for only AD using only identified       Estimated any ing if accouting for only AD unlocateble ercords for AD (accomplish ed by hating unlocateble ercords and applying the percentage of active duy to total number.         Total est AD using all labs for 90 day Total est AD using AAFP for 90 day AAFP Algorithm       \$2,576.00       \$3,864.00       \$6,808.00         Total est AD using all labs for 90 day AAFP Algorithm       \$2,576.00       \$3,864.00       \$6,808.00         Total est AD using all labs for 90 day AAFP Algorithm       \$2,576.00       \$3,864.00       \$6,808.00         Total est AD using all labs for 90 day AAFP Algorithm       \$2,576.00       \$3,864.00       \$6,808.00         Estimated overall provider improved compliance rate (21 of 48 encounters showed improved compliance rate (21 of 48       \$4,375%	Estimate annual savings for g'r if adopted using only identified savings if accordsr \$7,400       Savings if according according according of the savings if accordsr \$7,400       Savings if accordsr \$67,600         S23,000 at 0,000       precentage of of of percentage of only AD using only identified accordsr \$67,600       percentage of accords \$7,600       Savings if accordsr \$7,600         suing only AD using at 0,000       savings if accordsr \$67,600       accordsr \$67,600       Savings if accords \$7,600       accordsr \$67,600         suing only identified using only identified records \$7,600       savings if accords \$7,600       accords \$7,600       G(R)         suing only identified using \$1,000       savings if accords \$7,600       accords \$7,600       G(R)       G(R)         suing only identified using \$1,000       savings if accords \$1,000       G(R)       G(R)       G(R)       G(R)         records and records for \$1,000       accords and records that of active active \$1,000       Total act \$12,420.000       States \$2,576,000       St	Estimate annual awings - S23,000 at urrent practice for only AD using only dentified       Estimated issuings if acouting acouting for for of of of of of of of and eccords acceords for for AD is complished with the second for for AD is complished in the second for for AD is compliant and the second for for AD is compliant and second for for for AD is compliant and second for for for for for for for for for for	Estimate annual awings = 523,000 at current practice for only AD using only dentified       Estimated asings if acouting of of of of of of of of of of of of of	Estimate annual savings if s25,000 at current practice for only AD using only identified accounting accounting accounting accounting for for or one corrent accounting accounting accounting accounting for for or one corrent accounting accounting accounting accounting accounting accounting accounting accounting accounting for for or erecentage of analocateabl analocateabl analocateabl records accounting analocateabl analocateabl analocateabl analocateabl analocateabl records accounting analocateabl analo	Estimate annual savings for g/r if adopted using only identified records= 57,400       Estimated asvings if according according according according avings if according accordin	Estimate annual savings : 25,000 at urrent only AD using only identified       Estimated asvings if cocording       Estimated asvings if cocording       Total savings       Stimated estimated asvings       Istimated estimated asvings       I

## **Appendix E**

## Audit/Feedback Form

### Iron Deficiency Anemia Diagnosis Project Audit/Feedback Form



	Diagnostics	
Item	Yes	No (With explanation)
Adhered to AAFP Guideline? If		
"No", please explain at what point		
they deviated and any rationale		
given in the medical record for		
deviation.		

	Assessment/Evaluation	
Item	Yes (With explanation)	No
Was further evaluation for potential causes for IDA performed? If "yes', explain if rationale was given for why or if it can be inferred from chart review.		
Was a diagnosis achieved? (IDA, Thalassemia, etc.)		
Please state recommendations to provider for improvement if needed to facilitate feedback in these blocks.		

Practice Site:		Date of Audit: Auditor	:												
		Non-Compliant (please state at what			Occult	Electroph				Numberof	Number or type of	Waiver	Waiver	Length of time	Original Provider (first visit
Record Number	Compliant	point of the algorthim that they deviated)	CBC	Retic	Stool	oresis	Iron	TIBC	Ferritin	Return Visits	referrals	Approved	Denied	in Med hold	for problem/abnormal labs)
	_														
	_														

## Appendix F

## **RE-AIM Framework**

# <u>Reach</u>

Intended audience: The 18 Reid Clinic PCPs managing 10K BMT recruit healthcare

## **Maintenance**

Intervention sustainability: Selected permanent staff for project champions, continuous audit & feedback, leadership & stakeholder engagement & support, local policy changes

# **Effectiveness**

Impact of intervention: Implement AAFP guideline standardizing evaluation and diagnosis of IDA=> ↓costly & unnecessary diagnostic studies, ↓workload, excessive followup appointments

## **Implementation**

Actual adaptation of intervention: Interactive, educational platform, case studies, staff meetings, project champions, biweekly audit & feedback

# **Adoption**

Portion of staff to accept change: ≥ 11% of PCPs

## Appendix G

## PRISMA 2009 Flow Diagram



PRISMA – Lackland AFB – AAFP Algorithm Implementation Project

*Note*. This PRISMA flow-diagram outlines our literature review, the original number of articles discovered with our search parameters, and the final number of articles fully appraised after being screened against our inclusion and exclusion criteria.

# Appendix H

# Project Timeline

Post-arrival to phase II site	2019								2020				
(May 2019 – MAY 2020)	MAY	JUN	JUL	AUG	SEP	ОСТ	NOV	DEC	JAN	FEB	MAR	APR	MAY
Dissemination of project													
information to Phase II Site													
Director		x	X	x	x								
Completion of eIRB training		X											
Survey JBSA-Reid Clinic Site					v .								
Bevelop project					~								
Develop project					v								
proposal/updated draft CPG					^								
Initiated eIRB process					x	x							
Retrospective chart review					x								
Present project proposal to													
key stakeholders/leadership						X							
Present educational													
platform to staff members							X						
Collect data (IDA pt's, was													
algorithm followed, labs													
ordered, f/u, etc)								X	X	X			
Compile data for statistician										X			
Collect data from statistician													
and ready results for													
presentation										X	X		
Present results to leadership													
and key stakeholders											X		
Ensure project													
sustainability/ease of													
maintaining indefinitely											X	X	
Develop presentation for													
'Research Days" at USUHS											X	X	X
Present project/Graduation													X

# Appendix I

# Evidence Appraisal

Article Title	Author(s)	Bibliographic Citation	Yea r	Journa l	Purpose	Keywords	Population & Sample Size	Inclusion/Exclusio n Criteria	Study Design	Level of Evidenc e	Qualit y of study	Independe nt Variables	Dependent Variables	Statistical Tests	Strategies/Tools Studied	Study Results	Limitations	Article Appraise l Tool and
Using theory to improve low back pain care in Australian Aboriginal primary care: a mixed method single cohort pilot study	Ivan Lin; Juli Coffin; Peter O'Sullivan	Lin, I. B., Coffin, J., & O'Sullivan, P. B. (2016). Using theory to improve low back pain care in Australian Aboriginal primary care: a mixed method single cohort pilot study. BMC Family Practice, 17(44), 1– 14. doi: 10.1186/s12875- 016-0441-z	2016	BMC Family Practice	Improve care, reduce inappropriate radiographic increase psychosocial oriented patient assessment, and increase the provision of LBP self- management information to patients using a four-step naptical suing a f	Research translation, Musculoskeletal pain, Quality improvement, Guidelines, Health care, Evidence based practice, Theoretical domains framework	70 fulltime and partiime staff including GPs, nurses, and Aboriginal Health Workers, physiotherapist , social works, psychologists, midtwives, mental health workers, and staff working in health promotion programs.	Not specifically mentioned. Patients appears to be required to have low back pain to be included and providres must care for patients with low back pain to be included.	Mixed Method Cohort Study	Level - 4	B	Four-Step Implement a ion Interventio n Strategy	Imaging inconsistent with guidelines, Imaging consistent with guidelines, Pasychosocia I Assessment completed or not completed, and LBP informational handout given to not given to not	SPSS Version 21 used. proportiona 1 mathmatics , Basic confidence intervals and p- values obtained.	4-Step Systematic Intervention Framework - 1. Identify Target Behaviours 2. Understand Target Behaviours 3. Develop interventions to change behavior (use Theoretical Domains Framework as intervention) 4. Measure and understand change	88.9% decrease in inappropriate radiology orders after intervention giving an inference that there is an 88.9% increase in provider compliance (if each provider contributed equally to the radiologic orders).	Small sample size of practioners within one healthcare system. Generalizability is unknown. Possible bias by having	A i The Johns Hopkins Nursing Evidencebase d Practice Rating Scale
An Innovative Peer Assessment Approach to Enhance Guideline Adherence in Physical Therapy: Single- Masked, Cluster- Randomized Controlled Trial	Marjo Mass; Philip Van Der Wees; Carla Braam; Jan Koetsenruijt e r; Yvonne Heerkens; Cees Van Der Vleuten; Maria Nijhuis	Maas, M. J. M., Wees, P. J. V. D., Braam, C., Koetsenruijter, J., Heerkens, Y. F., C. P. M. Van Der Vleuten, & M. W. G. Nijhuis- Van Der Sanden. (2014). An Der	2015	Americ a n Physical Therapy Associa tion	Effectiveness of Peer Assessment vs Case Discussion as strategies to increase adherences to CPGs for physical therapists.	Communication Guideline Adherence*/organization & administration Humans Interprofessional Relations Knowledge of Results (Psychology) Peer Review, Health Card/methods Physical Therapy Specialty/standards* Practice Guidelines as Topic* Quality Improvement/organizatio n & administration	149 physical therapists from local community practices.	Physical therapists who work in small practices that responded to the invitation letter. Nothing else stated in the study.	Cluster RCT	Level - 2	A	Independen t /Covariates Interventio n s (Peer Assessment vs Case Discussion) and pretest scores.	Dependent - Clinical vignette and post tests.	IBM SPSS Version 20 was utilized for statistical analysis. Chi-square tests and unpaired t tests used. Cronbach Alpha was used for internal consistency of clinical vignettes. Multelevel linear regression used for clustering within communitie s of practice. ICC calculation for each outcome measure to test communitie s of practice communitie s of practice	Perr Assessment - Utilized peers to sit in three person groups and rate performance on eachother as they addressed the clinical problem that the CPG is built for. Case Discussion - Talk in large group about case that contains a problem that the CPG is for, similiar to a grandrounds	The Peer Assessment intervention was supprior to simple case discussion in enhancing provider adherence to CPG. Not by much, by a 5% change. Still elinically significant with a P-value of 0.03		The Johns Hopkins Nursing Evidencebase d Practice Rating Scale

Et	E i D	D I D D	2010	T 1	A	D	2 1 40	TT dd	C	T		DROCDER	4	II. to a	C 1 f	D	Description 14	T1 I.1
Elusive	Eric R.	Pedersen, E. R.,	2018	Implem	Assess the	Depression, Provider	2,149	Healthcare	Systema	Level - I	A	PROSPER	Appx 80-100	Hartung-	Grades of	Provider	Restricted to	The Jonns
search for	Pedersen,	Rubenstein,		e	effectiviness	intervention, Guidelines,	Providers and	providers from an	t			0 -	outcomes of	Knapp-	Recommendatio	interventions	RCTs as	Hopkins
effective	Lisa	L., Kandrack, R.,		ntation	of healthcare	Evidence-based, Major	239,477	outpatient setting.	ic			Systematic	interventions	Sidik-	n,	aimed at	pre/post studies	Nursing
provider	Rubenstein	Danz, M.,		Science	provider	1	patients from	L to the state of	Review			Review	reviewed, too	Jonkman	Assessment.	guideline	F	Evidence
interventions	Puon	Belsher B Motala			interventions	depressive disorder,	various mental	interventions aimed	of			Protocol	many to list	Random	Development	distribution or	are	Record
	Kyan K 1 1				that aim to	Primary care,	health	to increase	01			11010001	individually	Effects	and Evaluation	education are	difficulty to	Dascu
. a	Kandrack	A., Hempel, S.			in and ann to	Specialty care	neurun	adherences to	RCTs.				individuality.	Litects	(CDADE)	unlikely to be	methodologicall	Practice
systematic	, Marjorie	(2018). Elusive			merease		outpatients	depression						Meta-	(GRADE)	unikely to be	v intergrate with	Rating
review of	Danz,	search for effective			adherences to		settings across	and deliness has seeing						Analysys for	Approach for	effective	PCT.	Scale
provider	Bradley	provider			CPGs for		the globe.	guidelines by using						odds ratios,	quality of	without	KC1S.	
interventions	Belsher.	interventioner			depression.			some type of						standardized	evidence review	additional	(Cochorane	
to increase	Ancesa	interventions: a						strategy.						mean	for systematic	components.	Effective	
adherence to	Marth	systematic review of						Interventions aimed						differences.	review. Too	No speciific	Practice and	
evidence-	Motala	provider						at improving						incidence	many tools	mutlidimensiona	Organization of	
based	, Marika	interventions to						traatmant wara also						rate ratios	utilized to	1 platform	Organization of	
treatment for	Booth, Jody	interventions to						included Encluded						hanin	specifically list	showed	Care Group	
depression	Larkin, and	increase adherence						included. Excluded						basic	bara Ganarally	consitently	recommend	
depression	Susanne	to evidence-based						studies that looking						confidence	forward an	immental	combinging	
	Hemnel	treatment for						only at improving						intervals and	Tocused on	increased	controlled	
	riemper	depression.						screening,						pvalues, 12	provider	provider	pre/post studies	
		Implementation						assessment of						Statistics	education,	adherence to	with RCTs for	
		implementation						patients, or referral						used.	distrubution of	guidelines.	efficacious	
		Science, 13(99), 1–						behavior.							guidelines,	More research is	organizational	
		30. doi:													training sessions,	needed into	interventions)	
		10.1186/s13012-													tailored training.	better	These excluded a	
		018-0788-8													uni vs	interventional	They extuded a	
		010 0700 0													multidimensional	strategies to	large volume of	
															advantion ata	ahanca providar	studies that did	
															education, etc.	enance provider	not report	
																compliance to	specifically on	
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					1												nookeu al	
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					1												screening, or	
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					1												are all part of	
					1												the CPG that	
					1												could have	
					1												further shed	
					1												light on	
					1												provider	
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		1			1			1									adherence	
					1												secondarily.	

Article Title	Author(s)	Bibliographic Citation	Year	Journal	Purpose	Keywords	Population & Sample Size	Inclusion/Exclusion Criteria	Study Design	Level of Evidence	Quality of study	Independe nt Variables	Dependent Variables	Statistical Tests	Strategies/Tools Studied	Study Results	Limitations	Article Appraise l Tool and
A randomized matched-pairs study of feasibility, acceptability, and effectiveness of systems consultation: a novel implementation strategy for adopting clinical guidelines for Opioid prescribing in primary care	Andrew Quanbeck, Randall T. Brown, Aleksandra E. Zgierska, Nora Jacobson, James M. Robinson, Roberta A. Johnson, Brienna M. Deyo, Lynn Madden, Wen-Jan Tuan and Esra Alagoz	Quanbeck, A., Brown, R. T., Zgierska, A. E., Jacobson, N., Robinson, J. M., Johnson, R. A., Alagoz, E. (2018). A randomized matched-pairs study of feasibility, acceptability, and effectiveness of systems consultation: a novel implementation strategy for adopting clinical guidelines for Opioid prescribing in primary care. Implementation Science, 13(21), 1– 13. doi: 10.1186/s13012- 018-0713-1	2018	Impleme ntation Science	Determine the effectiveness of an innovative implementation "systems consultation" to improve provider adherence to CPGs for opiod prescribing in primary care settings.	Opioid prescribing, Evidencebased practice, Organizational coaching, Clinical practice guidelines, Organizational implementation strategies, Primary care	8 local community primary care clinics om tje UWHealth System (4 as a control and 4 as the intervention groups).	Excluded clinics with resident training, any clinics in which the consultants were actively working, EHRs required.	nonblind ed RCT	Level - 2	В	System's Consultatio n Strategy	Provider Adherence, opiod prescriptions, urine drug testings, treatment agreesments, etc. Basically, all items found within the CPG.	None stated; however, statistical data provided with basic confidence intervals and p values.	Systems Consultation Implementation Strategy utilizing the RE-AIM Framework.	Discovered a checklist-based and blended implementation strategy based on principles of system engineering is successful for implementing guildeines into practice. Statistically significant improvements were noted in muttple key criteria from the CPG. Four categories saw the following p-value changes: 0.024, 0.011, 0.012, and 0.019 indicating effective change to provider adherence to many key points from the CPG.	Large focus on opiod prescribing/opiod epidemic in the United States during study, possibly confounding efficacy of study results. Limitedpower study	A i The Johns Hopkins Nursing Evidencebased Practice Rating Scale

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Pacults from	Etvabarria	Etxabarria A	2018	PMC	Evoluate the	Diabatac	42 primar:	Ptc need to meet	Cluster	L aval II	٨	Multifacet:	Drimory: 0/	independent	Control:	Drimory	1 year time	The Johns
results from	Eixeberria,	Algerta J	2018	DIVIC	E valuate the	Diabetes,	45 primary	-ris need to meet	Cluster	Level II	А	J	rimary: %	f Student	Control:	rimary	i year ume	The Johns
the CLUES	Alcorta,	Alcorta, I.,		Health	effectiveness of	guidelines,	care units,	one: Diagnosis of	randomi			a	DM2 pts	t-Student	guidelines	outcomes:	frame may not be	Hopkins
study: a cluster	Perez,	Perez, I.,	1	Services	a multifaceted	health plan	448	DM2 documented in	zed trial	1	1	intervention	HgbA1C	test	introduced usual	Significant	iong enough; all	Nursing
randomized	Emparanza,	Emparanza, J., de	1	Research	tailored	implementation,	physicians	the medical record-	at 2	1	1	with	performed	implemented	way through	differences	physicians were	Evidence
trial for the	Velasco,	Velasco, E.,	1	1	intervention in	hyperlipidemias,	total : 21	Diagnosis of HTN	urban	1	1	presentation	annually: %	in IBM	email nublished	hetween	included even if	Based
avaluation of	Iglesias.	Iglesias, M., &	1		the	hypertension,	PCU (235	da aumanta din m	primary	1	1	, websites,	UTN ats 1s1	SPSS	and published	octween	didn't include all	Practice
evaluation of	Datasaha	Botnacha P (2018)			implementation	primary health	FCU (255	documented in med	care			workshops	HIN pts lab	version	on web,	groups were	of the training	Rating
cardiovascular	Kotaecne	Rotaecne, R. (2018).	1		of three	care.	ram	record; - Eligible for	aliniaa	1	1	1-	tests, alb-	19.and the	presented in	observed in	0	Raung Saala
guideline		Results from the	1		cardiovascular	cardiovascular	Phys) in	coronary risk	chines	1	1	1	creat ratio	correction	clinical meetings.	primary		Scale
implementation		CLUES study: A			riskrelated	risk factors	intervention	assessment, women					annually: %	by the	Intervention: In	outcomes in		
in primary care		cluster randomized			CPGs (HTN	TISK INCOID	gp and 22	45-75 and men 40-74					duclinidamia	design effect	addition to the	the		
in Spain		trial for the			DM2 and		PCU (213	with no ischemic					dystipidenna	(DE)	addition to the			
		evaluation of			DM2, and dealinidamia) in		FPs)	heart dz: - statin					at least one	(DE),	above also had	dyslipidemia		
		evaluation of			dyshpidemia) m		control gp	treatment started at					CR		multifaceted	CPG:		
		cardiovascular			primary care at			baseline and post					assessment		intervention with	increased CR		
		guideline			a Basque			intervention periods:					performed:		<ol> <li>presentation</li> </ol>	assessment for		
		implementation in			Health Service			coronary heart dz					Secondary		meetings led by	both women		
		primary care in			in Spain as			diagnosed during					% ptc with		Intectings feet by	and men. No		
		spain Bmc Health			compared with			handling and next					July A LC		physicians 2)	significant		
		Samian Bassanh			usual			baseline and post					HDAIC		Access to	differences		
		Services Research,			implementation.			intervention periods					%</td <td></td> <td>specifically</td> <td>were observed</td> <td></td> <td></td>		specifically	were observed		
		18(1), 93-	1							1	1	1	BP<140/80,		designed website	in diabetes and		
		93.	1							1	1	1	annual lab		with simple	hunartarniar		
l		doi:10.1186/s12913-	1	1				1	1	1	1	1	tests, annual	1	access to	CDC a minute		
1		018-	1							1	1	1	CR		access to	CPGs primary		
		2863-x	1							1	1	1	assessment,		recommendations	outcome. The		
			1							1	1	1	foot exams,		application tools	multifaceted		
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													prescribed		linked to	increased the		
			1							1	1	1			recommendations	CR assessment		
			1							1	1	1			recommendations	and improved		
			1							1	1	1			and patient	prescription,		
															education	but ineffective		
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															1110 101 C 1 2)	hypertension		
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																assessment was		
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																diabetic and		
																hypertensive		
																patients in the		
																intervention		
																group. Rates of		
																CR assessment		
l			1	1				1	1	1	1	1		1		before starting		
l			1	1				1	1	1	1	1		1		new stating		
			1							1	1	1				treatments also		
			1							1	1	1				in caunients also		
			1							1	1	1				mereased ,		
			1							1	1	1				resulting in a		
			1							1	1	1				lower rate of		
		1	1	1				1	1	1	1	1		1		statin		
			1							1	1	1				prescribing in		
			1							1	1	1				low risk		
			1							1	1	1				women.		
l			1	1				1	1	1	1	1		1		Diuretic		
			1							1	1	1				prescribing		
			1							1	1	1				was higher in		
		1	1	1				1	1	1	1	1		1		the		
			1		1					1	1	1				intervention		
		1	1	1				1	1	1	1	1		1		group Clinical		
			1							1	1	1				outcomes		
			1							1	1	1				(HbAlc and		
			1							1	1	1				blood process		
			1							1	1	1				control)		
			1							1	1	1				diffen hater		
			1							1	1	1				uffer between		
		1	1	1				1	1	1	1	1		1		groups, so no		
1			1							1	1	1				effect on		
1			1							1	1	1				clinical		
1		1	1	1				1	1	1	1	1		1		outcomes. May		
			1							1	1	1				need more than		
			1							1	1	1				educational		
1			1	1	1			1	1	1	1	1		1		intervention		

Article Title	Author(s )	Bibliographic Citation	r r	Journa I	Purpose	Keywords	Populatio n & Sample	Inclusion/Exclusi on Criteria	Study Design	Level of Evidenc	Qualit y of study	Independ e nt	Dependent Variables	Statistical Tests	Strategies/Tools Studied	Study Results	Limitations	Article Apprais e l
Barriers and strategies in guideline implementation A scoping review	Fischer, Lange, Klose, Greiner, and Kraemer	Fischer, F., Lange, K., Klose, K., Greiner, W., & Kraemer, A. (2016). Barriers and strategies in guideline implementation- A scoping review. Healthcare (Basel, Switzerland), 4(3), 36. doi:10.3390/healthcare403 00 36	2016	Healthc	Describe and categorize the most important barriers to guideline review and provide an overview of different kinds of strategies that are directly related to the underlying barriers so that information is provide do promote the effective implementatio n and incorporation of a guideline into practice	guideline implementation; scoping review; barrier; strategy	of 1659 articles, 69 articles included in review	guideline, implementation, English and German language, barriers or strategies, compfiance, acceptance, conformity, approval or adherence; Exclusion based on exclusively disease specific information on barriers or strategies that don't allow for generalizations, no direct reference to barriers or strategies for guideline implementation, no clinical guidelines, no comparability as with developing countries, and study protocol	Scoping Review based on Systemat ic Review and MetaAnalys e s	Level I	Α	see tools used	barriers and implementation strategies	n/a	Standard dissemination (e.g., receiving guideline via e-Mail) Dissemination of training material Continuing education Active learning from experts: opinion leaders Educational meetings Individualized feedback and group performance audit Quality circle Educational neetings Educational outreach visits Marketing outreach visits Identifying opinion leaders Financial opportunities/penalties Standing orders	central elements of successful strategies for guideline implementatio n: dissemination, education and training, social interaction, decision support systems and standing orders. A structured implementatio n can improve adherence to guidelines. Therefore, the barriers to guideline implementatio n an improve adherence need to be analysed in advance so that strategies that are tailored to the specific setting and target groups can be developed. PERSONAL FACTOR BARRIENS: Knowledge, lack of awareness and familiarity of the guideline sup of the guideline and target groups can be developed. PERSONAL FACTOR BARRIENS: Knowledge, lack of awareness and familiarity of the guideline and recs. Attitudes, lack of agreement, soft efficacy skills, outcome expectancy and motivation. Implementation : focus on dissemination at a deucational strategies such as active learning from experts and continuing education address knowledge deficit, audit and feedback address the attifued. Education- Need to have meetings, outreach visits, audit and feedback support systems and reminders, standing orders.	systematic review conducted via PubMed only with narrow search algorithm -	and i A i The Johns Hopkins Nusvidenc e Based Practice Rating Scale

Cluster	Goodfallo	Goodfallow I Agamval	2016	Implan	in obere or	barriar guidalina	16 gaparal	All general	Clustere d	L aval II	Δ	Gn	Drimory % of	aluctar	presentation	Mostly pagativa	Ganaral	The
randomised	w,	S., Harrad, F., Shepherd,		e	overweight	implementation;scopi	practices	practices in East	Random			Training in	obese/overweig	analysis	discussion,	findings. No	practices	Johns
trial of a tailored	Agarwal, Harrad,	D., Morris, T., Ring, A., Bakar P. (2016) Cluster		ntation Science	patients in	ng review;strategy	in control	Midlands of England invited:	ized Controll ed			practice teams in	ht patients to	general	BMI charts, leaflets,	guideline	included may	Hopkins Nursing
intervention to	Shepherd,	randomised trial of a			does a		in group, 12	Exclusion were	Trial			multiple	provider offered	linear	posters, referral	adherence in the	underrepresent	Evidenc
improve the	Morris, Ring	tailored intervention to			tailored		interventio	participation in another study of				areas	a wt loss	sensitivity	patnways) in 1 nr	compared with	of area; 9	e Based
overweight and	Walker	improve the management			implementatio		n	obesity and				according to NICE	intervention;	analysis;		the control with	month timeline	Practice
obesity in primary care in		in primary care in england.			intervention,		group	assessing similar				guidelines	of pts with BMI	generalize d		all study outcomes. The	t	Rating
england		Implementation Science,			in comparison			the previous year					or waist	estimating		process eval		beale
		11(1), 77-77. doi:10.1186/s13012-016-			with no intervention			and if the practice					measurement,	analysis		providers felt		
		0441-3			increase the			were planning to					% of pts with record of	-		more confiden		
					proportion of			change their					lifestyle			to manage		
					patients who are offered			over the trial period					assessment, %			obesity		
					weight								to wt loss					
					management								services, % pts managed within					
					the NICE								the practice via					
					guidelines								reterral, % of overwt/obese					
													pts who					
													changed their wt: mean					
													change wt over					
Adherence To	Hashmi &	Hashmi, N. R., & Khan, S.	2016	Journal	Provide a brief	Diabetes mellitus;	unknown #	unknown	Literatur e	Level V	С	physician	adherence to	n/a	health system	Factors	didn't include	The
Diabetes	Khan	A. (2016). Adherence to		of	review based	diabetes management,	articles		Review			pt	diabetic		structure, disease	affecting	how they	Johns
Treatment		diabetes mellitus treatment muidelines from theory to		Ayub Medical	review for an	adherence to	used					reminders,	guidennes		like physician patient	adherence:	literature search	Nursing
Guidelines		practice: The missing link.		College	ongoing	guidelines						training,			reminders, manpower	attributes of	to come up with	Evidenc
From Theory To Practice:		Journal of Ayub Medical		,	study being							referral			coordination, resource	guidelines and	conclusions.	e Based
The Missing		College, Abbottabad :		Abbotta badi	done by							coordinatio			allocations, incentives	implementation	Very	Practice
Link		JANIC, 28(4), 802-808.		JAMC	tertiary care							, data			important determinants	physician-	Unclear	Rating
					hospital in							monitoring			in diabetic patient	related	recommendatio	beate
					pakistan for										outcomes;Organizatio	factors, factors	ns	
					improving										nal strategies including	system and		
					diabetes										training appropriate	of guideline.		
					guidelines.										health care personnel	8		
					implementatio										communication among			
					n cycle and										the team members			
					framework for													
					factors													
					adherence to													
			1		and dollars an													

Article Title	Author(s)	Bibliographic Citation	Yea r	Journa l	Purpose	Keywords	Population & Sample Size	Inclusion/Exclusi on Criteria	Study Design	Level of Evidenc	Qualit y of study	Independe nt Variables	Dependent Variables	Statistical Tests	Strategies/Tools Studied	Study Results	Limitations	Article Apprais e l
										e								and
Systematic review and meta-analysis of the effectiveness of implementation strategies for noncommunicab le disease guidelines in primary health care.	Kovacs	Kovaes, E., Strobh, R., Phillips, A., Stephan, A., Müller, M., Gensichen, J., & Grill, E. (2018). Systematic review and meta-analysis of the effectiveness of implementation strategies for non- communicable disease guidelines in primary health care. Journal of General Internal Medicine, 33(7), 1142- 1154. doi:10.1007/s11606-018- 4435-5	201 8	Journal of General Internal Medici n e	Evaluate the effectiveness of interventions to improve guideline adherence of PCPs in the primary care setting, focusing on recent results.	evidence-based medicine; implementation; general practitioner; intervention; harvest plot.	involved at least 100 PCPS, 36 studies in harbost plot, 21 studies in forest plot (886 initial, 211 full test)	primary care providers; only providers in developed countries, English or german	System at ic Review and Meta Analysi s	Level I	Α	passive distro of the guideline or educational materials, meetings, elearning services, audit, motivationa 1 interview, reminder, patientmediat ed intervention	knpwledge transfer, diagnostic behavior, presestiption, patientbased outcomes	harvest plot, Egger test for asymmetry	(1): professional interventions targeting the health care provider directly, (2) financial interventions addressing either the provider or the patient by various means of incentives, (3) organisational interventions aiming to support the desired behaviour by modifying the setting and (4) regulatory interventions which introduce changes on the level of legislation.	Complex methods arent necessarily more effective. single- component interventions were equally effective as complex multifaceted intervention schemes in improving process of care and outcome of care. Diverse single intervention methods: audit, reminder, motivational interview, or patient-mediated intervention showed largest effect (73%). Similar rate of success observed for	Used only two databases so other literature may still be out there.	A i The Johns Hopkins Evidenc e Based Practice Rating Scale

	The Johns Hopkins Nursing Evidenc Based Practice Rating Scale
	Due to heterogeneo us body of evidence authors had difficulty in pinpointing any particular strategy be there was only a single study testing each strategy.
educational meetings (67%), multifaceted with combining 2 methods (65%) indicators effective). Least effective). Least effective). Least effective). Least effective were passive distro of materials, no organized activity. Active participation in educational process is key factor for success. Passively receiving educational materials was least effective	Eleven strategies significantly improved at least one measure of intermediate outcomes, final health outcomes, or resource use. Moderate strength of evidence supported using provider financial incentives such as pay for performance to improve the competence with which practitioners can implement evidence-based practices (EBPs). Inconsistent evidence with educational meetings, materials, and outrach; programs appeared to be successful in combination with reminders or providing practitioners suppared to be successful in combination with reminders or providing practitioners with newly collected clinical information. Low strength of evidence for no benefit for initiatives that included only educational materials or meetings (or both), or only educatinal anterials and outrach components. LOW BENEFIT:
INTERVENTION S: local consenses process, educational outreach visits, involvement of local opinion leaders, patient mediated interventions, audit and feedback, reminders, marketing and mass media, distribution of educational meterials, ecducational meetings	computer decision support for guidelines, internet portal to provide access to practice guidelines, paying practitioners to implement EBP, professional training plus feedback
	qualitative comparativ e analysis
	patient: access to care, satisfaction, treatment engagement, therapeutic alliance with practitioner provider: satisfaction with or acceptability of approach, protocol adherence/progra m model fidelity, competence/skill s, system: costs, uptake, feasibility, timeliness, penetration, sustainability
	quality improvemen t strategies, implementat ion strategies, disseminati on strategies, disseminati on strategies
	В
	Level I
	System at ic Review
	human, QI, implementation, and dissemination strategies that targeted systems, organizations, or practitioners that deliver mental health care to children and adolescents who were already experiencing mental health symptoms.
	19 studies of practitioners who care for children and adolescents with mental health problems
	Adolescents, Children, Dissemination, Evidence-based medicine, Implementation, Mental health, Quality improvement, Systematic review
	three goals: (1) assess the effectiveness of quality improvement, implementation strategies intended to improve the mental health care of children and adolescents; (2) examice harms associated with these strategies; and (3) determine whether effectiveness or harms differ for subgroups based on system, organizational, practitioner, or patient characteristics
	Implem e ntation Science
	201 7
	Forman-Hoffman, V., Middleton, J., McKeeman, J., Stambaugh, L., Christian, R., Gaynes, B., Viswanathan, M. (2017). Quality improvement, implementation, and dissemination strategies to improve mental health care for children and adolescents: A systematic review. Implementation Science, 12(1), 93–93. doi:10.1186/s13012-017- 0626-4
	FormanHoffma n, Middleton, McKeeman, Stambaugh
	Quality improvement, implementation , and dissemination strategies to improve mental health care for children and adolescents:a systematic review

						1	ĺ									(computer)		
Determinants of adherence to recommendatio ns for depressed elderly patients in primary care: A multimethods study	Aakhus, Eivind Oxman, Andrew D. Flottorp, Signe A.	Aakhus, Eivind Oxman, Andrew D. Flottorp, Signe A. (2014). Determinants of adherence to recommendations for depressed elderly patients in primary care: A multimethods study. Scandinavian Journal of Primary Health Care, 32(4): 170-170. doi: 10.3109/02813432.2014. 984	201 4	Scandin a vian Journal of Primary Health Care	dentify and prioritize determinants of adherence to six recommendatio ns for elderly patients with depression	Primary Health Care Depression – In Old Age Patient Compliance Practice Guidelines Human Norw ay Surve ys Surve ys Interviews Checklists Summated Rating Scaling Funding Source	740 healthcare professional s; 352 determinant s	Plausibility & feasibility	System at ic Review	Level I	A	quaity, improvemen t strategies, determinant s, disseminati on, recommend ations, methods	social contact, collaborative care plan, depression, care managers counseling, access to care, adherence, healthcare professionals	five-step framework described by Glenton and colleagues	survey, Social contact, collaborative care, care managers, counseling, media	(computer) The large number of determinants that we identified indicates the need for a systematic approach to prioritize which determinants to target in an implementation strategy. Healthcare professionals might want to might want to	Wide variation across communitie s, and paractices, heathcare professional s, and patients. Prioritizatio n of the determinant s was based on assessment	John Hopkins Nursing Evidenc e- Based Practice Rating Scale
						Aged Aged Health Personnel Patients Multimethod Studies										determinants in their own practices and could address many of the identified determinants on their own. However, a collective effort is necessary to improve adherence to these recommendatio ns and improve the care of depressed elderty patients.	importance of each determinant and the extent to which each determinant could be addressed.	

Article Title	Author(s )	Bibliographic Citation	Yea r	Journa I	Purpose	Keywords	Population & Sample Size	Inclusion/Exclusio n Criteria	Study Design	Level of Evidenc e	Qualit y of study	Independe nt Variables	Dependent Variables	Statistical Tests	Strategies/Tool s Studied	Study Results	Limitations	Article Apprais e l Tool and
Adherence to recommended australian sexually transmitted infections screening guidelines among asymptomatic men who have sex with men: A best practice implementatio n project	Baynes, A. McArthur, A.	Baynes, A., McArthur, A. (2014). Adherence to recommended australian sexually transmitted infections screening guidelines among asymptomatic men who have sex with men: A best practice implementation project. Joanna Briggs Institute Database of Systematic Reviews and Implementation Reports. 12(12): 210-226. doi: 10.11124/jbisrir-2014- 1989	2014	JBI Databas e of Systema t ic Reviews and Implem e ntation Reports	The goal of this project was to assess the level of staff compliance with evidence- based criteria, recommended in the Australian Sexually Transmitted Infection and HV Testing Guidelines 2014, for asymptomatic men who have sex with men attending Canbern Sexual Health Centre, and implement strategies to improve compliance if	article awareness chlamydiasis education evidence based practice follow up gonorrhea hepatitis C rapid test human knowledge clinical audit medical record men who have sex with men practice guideline sample size sexually transmitted disease syphilis systematic review	Eighty- three medical records were audited by the team leader, against the criteria for this four- week period.	compliance, a nurse practitioner, the clinical nurse consultant and a sexual health nurse, MSM, STI	Systema t c Review	Level I	A	collaborati o n, follow- up audit, multifacete d interventio n s	compliance, evidencebase d critteria, improve knowledge,		Joanna Briggs Institute (JBI) Practical Application of Clinical Evidence System (PACES) online software and Getting Research into Practice (GRIP) audit and feedback tool.	This project has demonstrated that increasing staff awareness through education and prompts has made a positive contribution to increasing compliance with national STI and BBV screening guidelines for guidelines for guidelines for MSM. This is an important first step in early diagnosis of BBV's and STIs, allowing for early treatment and contact tracing. This best practice implementatio	A limitation to the project was that some of the staff were unaware that new guidelines had been 2014. Another limitation of this audit was that it relied on a clinical audit of patient medical records, not on observation of actual practice. Some staff may have been compliant with the new guidelines, and advised their patients about the new recommendation have documented	A i John Hopkins Nursing Evidence - Based Practice Rating Scale

																n project showed how an evidence- based audit with staff feedback can facilitate change.	their compliance.	
ACC/AHA Special Report: Clinical Practice Guideline Implementation n Strategies: A Strategies: A Str	Chan, W. V. V. Pearson, T. A. Bennett, G. C. Cushman, W. C. Gaziano, T. A. Gorman, P. N. Handler, J. Krumholz, H. M. Kushner, R. F. MacKenzi e, T. D. Saeco, R. L. Smith, S. C., Jr. Stevens, V. J. Wells, B. L. Castillo, G. Castillo, S. K. Stephens, J. Vann, J. C.	Chan, W. V., Pearson, T. A., Bennett, G. C., Cushman, W. C., Gaziano, T. A., Gorman, P. N., Handler, J., Krumholz, H. K., Stephens, I., Smith, S. C., Jr. Stevens, V. J., Wells, B. L., Castillo, G., Heil, S. K., Stephens, J., & Vann, J. C. (2017). ACC/AHA special report: Clinical Practice Guideline implementation strategies: A summary of systematic reviews by the NHLBI implementation science work group: A report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines. Circulation, 135 (9): e122e137. doi: 10.1161/cir.000000000000 04 81	2017	Circulat i on	Review evidence from the published implementatio n science literature and identify effective or promising strategies to enhance the adoption and implementatio n of clinical practice guidelines.	American Heart Association Cardiovascular Diseases/diagnosis/*preventi on & control Hematologic Diseases/diagnosis/*preventi on & control Humans Lung Diseases/diagnosis/*preventi on & control National Heart, Lung, and Blood Institute (U.S.) United States *AHA Scientific Statements *Cost *detailing *effectiveness *cost *cotec-based *interventions *reminders *systematic review	826 articles and 55 were selected; critical questions, each focusing on the adoption and effectivenes s of 4 intervention strategies	Reviews were excluded if they did not focus on CPGs or on the implementation of a clinical practice that directly affected patient care. Reviews were also excluded if they did not include interventions aimed at clinicians or focused on the implementation of adminis- trative practices.	Systema t ic Review	Level I	A	improveme n t stratogies, determinan t s, disseminati on, recommend ations, methods, quality	clinical questions, knowledge, protocol, adherence, model,	The Implementatio n Science Work Group (ISWG) developed a conceptual framework— based on the Multilevel Approaches Toward Community Health (MATCH) model4—to define 4 levels where guideline imitiated imitiated n strategies can be initiated initiated initiated initiated initiated initiated policy level, clinical institution level, provider level, and pa- tient level.	Audit and feedback and educational outreach visits	found gen- eral effectiveness for 2 of the 4 selected implementatio n interventions (educational outreach visits and audit and feedback) for improving process of care and clinical out- comes.	Data used in this report were not retrieved from the primary studies, thus limiting information on the details of the interventions and reported by the review authors. Second, this report used a qualitative synthesis of the evidence, which does not allow an as-sessment of the size of any expected benefits from the implementation of an implementation for the guality of the review authors of the authors of the guality of the review. Third, analysis in this report is limited to 4 interventions law di not explore systems- level implementation.	John Hopkins Nursing Evidence - Based Practice Rating Scale

Article Title	Author(s)	Bibliographic Citation	Yea r	Journa I	Purpose	Keywords	Population & Sample Size	Inclusion/Exclusio n Criteria	Study Desig n	Level of Evidenc e	Qualit y of study	Independe nt Variables	Dependent Variables	Statistical Tests	Strategies/Tool s Studied	Study Results	Limitations	Article Apprais e l Tool and
Development of a theoryinformed implementation intervention to improve the triage, treatment and transfer of stroke patients in emergency departments using the Theoretical Domains Framework (TDF): the T(3) Trial	Craig, L.E.	Craig, L. E., Taylor, N., Grimley, R., Cadilhae, D. A., McInnes, E., Phillips, R., Middleton, S. (2017). Development of a theoryinformed improve the triage, treatment and transfer of stroke patients in emergency departments using the Theoretical Domains Framework (TDF): the T3 Trial. Implementation science : IS, 12(1), 88. doi:10.1186/s13012 -017- 0616-6	2017	Implem e ntation Science	To descrive the development of an implementatio in intervention using theory to inform selection of behaviour change techniques, and evidence of effectiveness of implementatio n of interventions	Attitude of Health Personnel Blood Glucose Body Temperature Emergency Service, Hospital/*organization & administration/standards Guideline Adherence Humans Inservice Training Patient Transfer/*organization & administration/standards Personnel, Hospital/*psychology Practice Guidelines as Topic Profsesional Role Prospective Studies Psychological Theory Quality Indicators, Health Care Single-Blind Method Stroke/diagnosis/*therapy Thrombolytic Therapy Thrombolytic Therap	omprised of 12 different clinical care elements (hereonin referred to as 'target behaviours' [Table 1])	outpatient settings, providers,	RCT	Level I	A	theory, behavior change, developmen t, implementat ion, intervention	theoretical doman framework, effectiveness , evidence- based	The T3 Trial clinical intervention is an evidence- based care bundle of clinical protocols for triage, treatment and trans- fer of patients following acute stroke	Theoretical frameworks and models based on behaviour change theories	he TDF was successfully applied in all steps of develop-ing an implementation n intervention for the T3 Trial clinical protocols. The use of use of use of success in terms of incorporating research evidence and well-informed judg-ment and incorporating the important practical issues of feasibility and acceptability.	further work to clarify TDF domain definitions and to provide example barriers for each domain would complement this mapping process and minimise disagreements	A i John Hopkins Nursing Evidence - Based Practice Rating Scale
Effectiveness of a multifaceted implementation strategy compared to usual care on low back pain guideline adherence among general practitioners	Arnela Suman, Fredericke G. Schaafsma, Peter M. van de Ven, Pauline Slottje, Rachelle Buchbinder, Maurits W. van Tulder, and Johannes R. Anema	Suman, A., Schaafsma, F. G., van de Ven, P. M., Slottje, P., Buchbinder, R., van Tulder, M. W., & Anema, J. R. (2018). Effectiveness of a multifaceted implementation strategy compared to usual care on low back pain guideline adherence among general practitioners. BMC health services research, 18(1), 358. doi:10.1186/s12913 -018- 3166-y	2018	BMC	Evaluate the effect of a multifaceted implementatio n strategy on guideline adherence among Dutch general practitioners	Primary health care, Low back pain, Health plan implementation, Guidelines, Referral and consultation	2453 patient contacts in the usual care group and 2677 patient contacts in the implementatio n group	GPs in Amsterdam with LBP patients; patients 18-76	RCT	Level	В	Multicompo nent, multidiscipl inary continuing medical education (CME) training in which interdiscipli nary communicat ion and collaboratio n (i.e. between GPs, physiothera pists, and occupationa 1 physicians), and patientphysicia	reduce referrals to medical specialist consultation and diagnostic imaging, and to increase consideratio n of psychosocial and occupational risk factors	Descriptive statistics, perfromance indicators (Generalize d Estimating Equations (GEEs))	online and offine educational materials, and social media platforms (i.e. forum, Twitter, Facebook) supplemented the CME training. This professional based strategy was supported by a patient- based etHalth strategy consisting of informative videomessages, informative videomessages, informative strategy cassisting of informative strategy consisting of informative strategy consisting of informative strategy cassisting of informative strategy cassisting of informative strategy cassisting of informative strategy cassisting of informative strategy cassisting of informative strategy cassisting of informative strategy cassisting of informative strategy informative strategy strategy cassisting of informative strategy cassisting of informative strategy strat	The overall rate of imaging requests decreased over time in both groups. There was no increase in either group over time in the number of times GPs registered consideration of psychosocial or occupational factors, or in the number of referrals for psychosocial care. The numbers of referrals for psychosocial care. The numbers of referrals to occupational physicians was very low in both groups at baseline and remained low over time.	Limited to one metropolitan area. Not all GPs attended CME training. Most GPs may have previous training on LBP guidelines	The Johns Hopkins Nursing Evidence Based Practice Rating Scale

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Effect of audit and feedback with peer review	J. Trietsch, B. van	Trietsch, J., van Steenkiste, B., Grol, R., Winkans, P	2017	BMC	Effect of audit and feedback with peer	Physician's practice patterns, Education, Medical,	197 GPs working in 88 practices	GPs of local quality improvement collaboratives	RCT	Level I	С	audit and comparative feedback	test ordering and prescribing	Chi-square test or Ttest	audit and feedback with peer review	Benefits from other studies were not confirmed in	Perception of partipants; unattainable	The Johns Hopkins
on general practitioners' prescribing and test ordering performance: a clusterrandomize d controlled trial	R. Grol, B. Winkens, H. Ulenkate, J. Metsemaker s , and T. van der Weijden	Ulenkate, H., Metsemakers, J., & van der Weijden, T. (2017). Effect of audit and feedback with peer review on general practitioners' prescribing and test ordering performance: a clusterrandomized controlled trial. BMC family practice, 18(1), 53. doi:10.1186/s12875 -017-			general practitioners' prescribing and test ordering performance: a cluster- randomized controlled trial	Clinical audit, Clinical evaluation, Physician prescribing pattern										this trial. Did not see a decrease in drugs prescribed; audit and feedback not feasible	goais; lack of quality indicators; failed to recruit sufficient sample size; results may have been skewed	Evidence Based Practice Rating Scale

Article Title	Author(s)	Bibliographic Citation	Year	Journal	Purpose	Keywords	Population & Sample Size	Inclusion/Exclusion Criteria	Study Design	Level of Evidence	Quality of study	Independe nt Variables	Dependent Variables	Statistical Tests	Strategies/Tools Studied	Study Results	Limitations	Article Appraise I Tool and
Strategies for guideline implementation in primary care focusing on patients with cardiovascular disease: a systematic review	Susanne Unverzagt, Matthias Oemler, Kristin Braun, Andreas Klement	Unverzagt, S., Oemler, M., Braun, K., & Klement, A. (2014). Strategies for guideline implementation in primary care focusing on patients with cardiovascular disease: A systematic review. Family Practice, 31(3), 247266. doi:10.1093/fampra/cmt080	2014	Family Practice	Find which implementation strategy can improve physician adherence to the recommendations of guidelines in primary care.	Cardiovascula r discase, guidelines, meta-analysis, physician adherence, pyrimary care, systematie review.	Eighty-four trials (54 trials compared unimodal strategies and 30 multimodal strategies to usual care); 15 trials investigated provider evider education, 4 patient education, 5 promotion of selfmanagement and 14 organizational change.	Only RCTs; patients in primary care with CVD; 3 months post intervention data	Systemat ic Review and Meta Analysis	Level I	В	Unimodal and intervention techniques	Physician adherance	RevMan 5	Provider reminder systems; audit and feedback; patient education; provider education; promotion of self- management; organizational change	Reminder systems = positive; audit and feedback = mixed; Provider education = positive; patient education = mixed; patient education = mixed; patient education educa	Contamination of the treatment of patients in the control group cannot be ruled out	A i The Johns Hopkins Nursing Evidence Based Practice Rating Scale

# Appendix J

# Synthesis of Interventions

	Audit (JBI	Standi	Media (PUBLISHED ON	Feedback		PERSONAL Education		IN PERSON	Distribute CPG e.g.,	GRADE	4-step Systematic	Change	Conceptual	RE-AIM	Theoretical
	PACES &	ng	WEB, ELECTRONIC	(individual	Sur	(MATERIAL, CMES, e-	Algori	Professional Training	email, lamination,	approac	Intervention	targeted	framework -	Frame	Domain
Authors	GRiP)	Order	MEDICAL ALERTS)	/grp)	vey	learning;PAMPLETS)	thms	e.g., workshops	reminders	h	Framework	behaviors	MATCH MODEL	work	Framework
Lin et al.	X-↑			X-↑			Х-↑	Х-↑	X-↑		x - 个	x-↑			x-↑
Pederse															
n et al.						x-√		X-4/	x-↓	×↓					
Andrew	~ ^			v .				V A						~ ^	
et al.	A-1			A-1				X- 1						×- 1	
Etxeberr			×۸			v۸	vA	v A	v A						
ia et al.						~1	^1	~1							
Fischer	x↑	x↑		×↑		x↑	ХŢ	×↑	x 🛧						
et al.															
Goodfell						x↓	X↑	X↑	×↓						
ow et al.															
Hashmi				X↑		ХŢ	ХŢ	x↑	X↑						
& Khan	v 🔨		V I	v./\		v I		v.	v.			~			
Forman-			^V			^\									
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et al.															
Aakhus															
et al.			X↓		x↑	X↓		XT	x↓						
Bavnes															
&	V.A.		V I	V.A.		V I			V I						
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et al.															
Trietsch	x↓			×↓											
et al.															
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greral.															
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e	1	1	4	1	1	7	1	3	8	1	0	0	0	0	0
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Summari															
zed	7	0	-3	10	-1	-3	4	7	-2	-1	1	6	1	1	2
Total															

# Appendix K

# Completion Verification Form

**	K. Inouye Graduate Schoo	l of Nursing			
DNP Pro	oject Completion Verificat	ion Form			
	DOCTOR OF NU Comple	JRSING PRACTIO tion Verification F	CE PROJECT orm		
The DNP Project title Iron Deficiency Anemi Reid Medical Clinic by	<b>d:</b> Implementing an Evic a (IDA) in Female Basic the following student(s)	dence-Based Algorit Military Training R :	hm for the Diagnosi lecruits was complet	s and Evaluation of ed at JBSA-Lackland,	
(type student <u>nar</u>	<u>ne)</u>	(signature)	(4	late)	
Melissa Everage_	Melíssa E	verage	28 M	arch 2020	
Virginia Frazier Virgin		Frazier	28 M	28 March 2020	
Nicholas Robertson Nichola		Robertson	tsov 28 March 2020		
Matthew Simmon	ns Matthew	Símmons	28 M	arch 2020	
Verified by:					
vernied by.					
(type <u>name)</u>	(signature)		(date)		
(type <u>name)</u> Dr. Janice Williams	(signature) Janíce Willía	M\$	(date) _ 28 March 2020	Senior Mentor	
( <i>type <u>name</u>)</i> Dr. Janice Williams Lt Col John William	<sup>(signature)</sup> Janíce Willía Ison John Willíam	ms son	(date) 28 March 2020 28 March 2020	Senior Mentor Team Mentor	
( <i>type <u>name</u>)</i> Dr. Janice Williams Lt Col John William Lt Col Karla Dennar	(signature) Janíce Wíllía Ison John Wíllíam rd Karla Denna	ms son rd	(date) 28 March 2020 28 March 2020 28 March 2020	Senior Mentor Team Mentor Team Mentor/Phase II Site Director	
( <i>type <u>name</u>)</i> Dr. Janice Williams Lt Col John William Lt Col Karla Dennar	(signature) Janíce Willía nson John Willíam rd Karla Denna rly - add the following addi	MS SOV rd tional signature for fit	(date) 28 March 2020 28 March 2020 28 March 2020 nal verification of proj	Senior Mentor Team Mentor Team Mentor/Phase II Site Director	
( <i>type <u>name</u>)</i> Dr. Janice Williams Lt Col John William Lt Col Karla Dennar <i>For RNA Students on</i> RNA Project Directo	(signature) Janíce Willía nson John Willíam rd Karla Denna nly - add the following addi or (type <u>name)</u>	M& vd tional signature for fit	(date) 28 March 2020 28 March 2020 28 March 2020 nal verification of proj tture)	Senior Mentor Team Mentor Team Mentor/Phase II Site Director Fect completion: (Date)	
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( <i>type <u>name</u>)</i> Dr. Janice Williams Lt Col John William Lt Col Karla Dennar <i>For RNA Students on</i>  RNA Project Directo	(signature) Janíce Willía Ison John Willíam Ison Karla Denna Ily - add the following addi	Ms vd tional signature for fit	(date) _ 28 March 2020 _ 28 March 2020 _ 28 March 2020 mal verification of proj ture)	Senior Mentor Team Mentor Team Mentor/Phase II Site Director fect completion: (Date)	