An Educational Module to Improve Provider Knowledge of Recommended Opioid Prescribing Practices

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Abstract

Purpose: The United States is facing an opioid epidemic that is placing a tremendous health and economic burden on the country. Primary care providers face the responsibility of following national guidelines and state laws to provide safe care to their patients, yet there is evidence that clinicians lack knowledge of treating patients with chronic pain. The purpose of this project was to provide an educational intervention to primary care providers on best opioid prescribing practices according to the 2016 Centers for Disease Control and Prevention Guidelines for Prescribing Opioids for Chronic Pain and 2017 New Jersey Substance Abuse Disorder Law.

Methodology: An educational module synthesizing guidelines and laws was created and delivered to primary care providers in a healthcare system in Northern New Jersey through an existing electronic platform. Electronic surveys were used to assess providers' knowledge pre and post intervention. The number of Naloxone prescriptions written were compared pre and post intervention to evaluate a change in practice. A Wilcoxon signed rank test was used to determine statistically significant test score changes pre and post intervention and a Chi-Square test was utilized to measure frequencies of Naloxone prescriptions pre and post intervention.

Results: 79 primary care providers participated in the educational activity. Data analysis demonstrated a statistically significant ($p < 0.000$) difference in scores from pre test to post test, with an overall increase in test score of 33.3 points. An increase in frequency of naloxone prescriptions was also found.

Implications for practice: This project attempted to improve provider's knowledge and practices of opioid prescribing. This project can be adopted in multiple healthcare

settings. Future research should explore whether an increase in provider knowledge can be translated into reduced opioid-related morbidity and mortality and improved patient's safety.

An Educational Module to Improve Provider Knowledge of Recommended Opioid Prescribing Practices

Introduction

The United States is currently facing an opioid epidemic that has been emerging since the late 1990s and is placing a tremendous health and economic burden on the country. The nature of this project was to disseminate an educational intervention to primary care providers working for a well-known medical group in northern New Jersey regarding best opioid prescribing practices according to the Center for Disease Control and Prevention's (2016) *Guideline for Prescribing Opioids for Chronic Pain* and New Jersey's 2017 Substance Abuse Disorder Law. The expectation was that an educational intervention that improves provider knowledge would lead to a change in opioid prescribing practices on a local level while further contributing to the crusade towards ending the opioid epidemic nationwide.

Background & Significance

While the onset and progression of the opioid epidemic in the United States is well documented, as a nation, we are now only in the early stages of eradicating it. Kanouse and Compton (2015) trace the beginning of the epidemic to the early 1990s when the healthcare arena began a movement towards improved pain control. In 1992, the Agency for Healthcare Quality and Research published a report that concluded patients were being deprived of adequate pain management. Shortly thereafter, in 1995, the American Pain Society campaigned for pain to be recognized as the fifth vital sign, followed by the Joint Commission on Accreditation of Healthcare Organizations encouraging that pain control be treated as a fundamental patient right in 2000. In 1998,

the Federation of State Medical Boards developed a guideline for the use of opioids in pain management and, in 2001; the Drug Enforcement Agency (DEA) supported the use of opioids in pain management, despite acknowledging their potential for abuse. Even though indications for prescribing opioids for chronic pain were spreading rapidly, a comparable lack of data on the safety of prescribing opioids long-term lagged behind (Kanouse & Compton, 2015). At the same time, pharmaceutical industries were marketing opioids with unsupported claims that addiction occurred in less than 1% of patients prescribed opioids. Discount card and marketing efforts were especially targeted at primary care providers, who lacked special training in pain management despite providing the majority of chronic pain treatment (Kanouse & Compton, 2015). Consequently, multiple factors attributed to the subsequent sharp rise in the number of opioid prescriptions written in the United States: the identification of chronic pain as a public health issue, misinformation from pharmaceutical companies, lack of adequate data, backing from healthcare accrediting organizations, and the naïveté of prescribers.

The aforementioned factors resulted in a dramatic increase in the number of opioid prescriptions written between 1998-2007: hydrocodone increased by 198%, oxycodone increased by 588%, and methadone increased by 933%. In fact, hydrocodone with acetaminophen (Vicodin) became the most prescribed drug of any medication class, a total of 100 million prescriptions, while the second most prescribed drug was Atorvastatin, an anti-cholesterol drug, with a total of 63 million prescriptions written (Kanouse & Compton, 2015). Despite the fact that the United States represents only 4% of the global population, the nation was responsible for more than 80% of the world's prescription opioid consumption (Kanouse & Compton, 2015).

The sharp rise in opioid prescriptions written has been associated with the rise in people who abuse prescription drugs, the rise in opioid-related deaths, and the rise in heroin abuse. From 1992 to 2003 the number of people abusing prescription opioids increased by 81%. In addition, from 1999 to 2009 the number of prescription opioid-related deaths increased three-fold, and the number of people abusing heroin more than doubled (Kanouse & Compton, 2015). The increase in heroin use has been attributed in part to the expense of prescription opioids as well as the ease of obtaining heroin. Abusers of prescription opioids may turn to heroin as it poses a significantly lower financial burden; illegally obtained prescription opioids have been estimated to cost $160 per day as compared to an equivocal dose of opioid components found in heroin at just $20 per day (Kanouse & Compton, 2015). The CDC (2017) stated that 75% of new heroin abusers report abusing prescriptions opioids prior to starting heroin. Presumably, if opioid prescription abuse decreases, fewer people will gateway into heroin use leading to a resultant decrease in the number of opioid- and heroin-related deaths. Interestingly, despite the overwhelming rise in prescription opioids that were intended to treat America's self-reported pain, there was no measurable change in self-reported pain (Daubresse, 2013).

The opioid epidemic does not discriminate; Americans of all age groups, ethnicities, and socioeconomic backgrounds are affected. Statistics do demonstrate that certain groups are at higher risk; the most common opioid related overdose deaths from 1999-2014 were people aged 25-54, non-Hispanic white males (CDC, 2017). Data has also demonstrated some risk factors for opioid abuse and overdose including those who obtain prescriptions from multiple and overlapping providers or pharmacies, those

consuming high daily doses, those with a history of alcohol or substance abuse, and those who are low income or live in rural areas (CDC, 2017).

Approximately two million people in the United States had an opioid abuse disorder in 2015 with an accompanying economic burden estimated at 78.5 billion dollars (Guy et al., 2017). Policies nationwide have been impacted by the epidemic on both federal and individual state levels. In 2010, President Obama presented a 5-year plan to decrease the burden of prescription opioid abuse in the *National Drug Control Strategy* report that highlighted the need for collaboration between the government, law enforcement, health care, and regulatory bodies (Kanouse & Compton, 2015).

Healthcare systems and healthcare providers are battling the opioid epidemic from the frontlines. In particular, primary care providers face an overwhelming responsibility to follow national guidelines and state laws while providing safe care for their patients. However, no specific pain management education is required or readily available for primary care providers. For these reasons, the project's educational module was disseminated to primary care providers in a health system in New Jersey, a state where opioid abuse continues to be a major issue. The educational module that was developed synthesized the CDC guidelines and the New Jersey Substance Abuse Disorder Law regarding opioid prescribing while highlighting the most important concepts to create a protocolized approach to managing chronic pain patients.

Needs Assessment

Overwhelming statistics exist regarding the opioid epidemic in the United States. In 2012, when opioid prescribing was at its peak, there were a total of 255 million prescriptions written at a rate of 81.3% per 100 persons. In 2016, it fell to its lowest in

more than 10 years, at 214 million prescriptions written at a rate of 66.5% per 100 persons. Improvement is evident, but the epidemic is still in the beginning stages of amelioration. Nationally, opioids, both prescription and illicit, were involved in 42,249 deaths in 2016, five times higher than the number of deaths in 1999 (CDC, 2017). The states with the highest rates of overdose-related deaths in 2016 were West Virginia, Ohio, New Hampshire, Pennsylvania, and Kentucky. Additionally, a total of 25 states, including New Jersey, had statistically significant increases in opioid-related deaths (CDC, 2017). The statistically significant increase noted in nearly half of our nation's states demonstrates need for further intervention at the state level. Further statistics reveal that New Jersey continues to have high prescribing rates despite the release of both the CDC guidelines and the NJ Substance Abuse Disorder Law. In 2016, the New Jersey County with the highest prescribing rate was Cumberland (91.7%) and the county with the lowest prescribing rate was Hudson (36.9%). The project took place in two New Jersey counties, Bergen County, which in 2016 had an opioid prescribing rate of 42.5% and Passaic, which had a prescribing rate of 45.9 % (CDC, 2017).

According to the CDC (2017) those at highest risk of dying from overdose (categorized as those who abuse opioids >200 days per year), acquired opioids by obtaining their own prescriptions (27%), getting them for free from friends/relatives (26%), purchasing them from friends/relatives (23%), or buying them from a drug dealer (15%). Evidently, there is a great need to keep prescription opioids out of America's medicine cabinets and the hands of drug dealers and abusers. Attempts thus far to address the problem at the federal and New Jersey state level include the release of the CDC guidelines and the NJ Substance Abuse Disorder Law. Since treatment of chronic pain is

commonly encountered throughout primary care practices, it is crucial that these providers are confident in prescribing guidelines and law. However, without adequate familiarity of the guidelines and law, prescribers cannot proficiently apply them to practice.

The need for further education regarding opioid prescribing was identified within a New Jersey healthcare medical group comprised of over 20 medical practices. The medical director of the group reported that providers have expressed concerns and discomfort in managing chronic pain patients, particularly since the New Jersey opioid prescribing law has been released. Within this northern New Jersey medical group, chronic pain patients were often referred to pain management specialists for treatment. However, pain management specialists have since become overwhelmed and begun referring back to primary care providers for continuing treatment. Although challenging, these primary care providers will undoubtedly encounter patients with pain, making it imperative to educate and increase prescriber knowledge and comfort with pain management.

Problem/Purpose Statement

The onset of the opioid epidemic began in the late 1990s when routine treatment of chronic pain with opioids was adopted by the medical profession. The overwhelming consequences of this practice were initially unknown and escalated at an alarming pace to a crisis of epidemic proportions, resulting in opioid abuse and corresponding opioid-related deaths. The United States is now in the beginning stages of remedying the damage done through the use of treatment approaches to chronic pain that are both safe and effective. Primary care providers are at the forefront of initiating and maintaining this

culture change, yet there is evidence that these providers lack knowledge and confidence in treating chronic pain patients. Therefore, it is imperative for primary care providers to receive adequate education and resources to safely and effectively manage their patients who suffer from chronic pain.

Clinical question

Will an educational module designed for primary care providers increase provider knowledge of prescription opioid therapy guidelines?

Aims and Objectives

The overarching aim of this project was to increase prescriber's knowledge and practice of recommended opioid prescribing practices. The project sought to cohesively increase familiarity with these recommendations through a series of proposed outcomes:

1. To increase prescriber understanding of the New Jersey State Substance Abuse Disorder Law.
2. To increase prescriber understanding of the CDC guidelines for prescribing opioids for chronic pain.
3. To increase number of naloxone prescriptions post implementation of the educational intervention.

It was the hope of the project that by reaching the stated objectives, prescribers will have an increased knowledge of recommended guidelines therefore leading to safe patient outcomes, decreasing the risk for opioid use disorder, and decreasing the overall usage of opioids for chronic pain in patients treated in primary care.

Review of Literature

An in-depth review of the literature was conducted to identify primary care provider knowledge regarding the prescribing of opioids, current recommended opioid prescribing guidelines, and the relationship between education and correct opioid prescribing practices. The key phrases “primary care prescribers” and “opioid prescribing guidelines” were initially entered into CINAHL and Medline, and yielded 18,223 results. The search was further narrowed down using the additional key phrases, “provider adherence” and “educational intervention”, and after an analysis of the literature, a total of eleven references were chosen, comprised of both research articles (9) and evidence based guidelines (2).

Out of the eleven reviewed references, two included non-research references, of the remaining nine research studies, five were non-experimental, two were quasi-experimental, one was a systematic review, and one was a randomized control trial. Of the five non-experimental studies, four were descriptive surveys that assessed knowledge and provider attitudes regarding prescribing of opioids, and one was an observational study. All of the research took place in the United States, and the majority of studies focused on primary care prescribers, one was patient focused, and another retrospectively analyzed prescribing trends. The included studies were assessed for methodological quality utilizing the John’s Hopkins evidence appraisal tool. Based on this assessment, levels of evidence were assigned to each of the research studies, one was rated high quality, and the remaining were of good quality. One study was a level I, three were level II, five were level III, and two non-research studies were level IV. The majority of the studies were non-experimental surveys and therefore were limited in determining actual

prescribing practices. Additional limitations included small sample sizes, convenience sampling, and a lack of assessment of clinical outcomes (see Appendix A).

In response to the increasing mortality related to prescription opioids, the Centers for Disease Control developed a set of evidence-based guidelines for the prescribing of opioids for acute and chronic nonmalignant pain. The guidelines provide an inclusive and thorough review of recommended opioid prescribing practices. Notably, nonpharmacological and nonopioid therapies are the hallmark recommendations of chronic pain treatment with opioids being offered as a final option for pain. Opioids are recommended only after both the risks and goals of treatment have been discussed with the patient, and after the patient is made aware that long term benefits of using opioids for chronic pain have not been demonstrated. The CDC guidelines go on to provide recommendations on the dosing of opioids, how to taper or discontinue opioids, the utilization of prescription drug monitoring programs and patient contracts, urine drug screening, and the co-prescribing of naloxone (Dowell, Haegerich, & Chou, 2016).

In 2017, the Substance Abuse Disorder Law was released in New Jersey in response to the opioid epidemic. The law includes strict recommendations regarding the prescribing of opioids. These recommendations include: 1. That a prescriber document their discussion with their patient regarding the risks associated with opioids, 2. That a prescriber develop a treatment plan prior to beginning any pain treatment, 3. That initial opioid prescriptions not exceed a five-day quantity for both acute and chronic pain, 4. That a signed patient agreement occur after the third consecutive opioid prescription, and 4. That substance abuse disorder treatment must be covered by insurance carriers. The law also defines that continuing medical education include educational programs

regarding the prescribing of opioids, alternative regimens, management and treatment of pain, and risks and warning signs for opioid abuse disorder (NJ Substance Abuse Disorder Law, 2017).

A common theme arose throughout the literature; a significant knowledge deficit exists regarding the correct prescribing of opioids and recommended guidelines (Macerello et al., 2014; Kennedy-Hendricks et al., 2016; Pearson et al., 2016). Kennedy-Hendricks et al. (2016), surveyed providers regarding treatment options for chronic pain, and nearly half of the respondents stated that opioid regimens were appropriate for the management of chronic pain. This finding contradicts the recommendations put forward by the CDC that opioids have not been shown to be effective in the treatment of chronic pain (CDC, 2016). The knowledge deficit was further reiterated through a study that demonstrated providers scored low when questioned about recommendations regarding opioid prescribing (Pearson et al, 2016). Overall, providers demonstrated inadequate knowledge of opioid prescribing guidelines, a concern for inducing harm on their patients with the use of prescription opioids, and lack of adherence to a protocol or guideline for prescribing (Pearson et al., 2017; Liebshutz et al., 2017; Nuckols et al., 2014).

The opioid epidemic has the potential to incur further morbidity and mortality on the general population, and as previously stated, multiple sources have identified the need for further prescriber education of evidence-based recommendations for the prescribing of opioids for non-malignant chronic pain (Macerello et al., 2014; Kennedy-Hendricks et al., 2016; Pearson et al., 2016). Increasingly concerning is the lack of a correlation between the release of evidence-based guidelines and a decrease in the overall number of opioid prescriptions and opioid related deaths (Guy et al., 2017). This highlights the need

for further education for prescribers of opioids. As a result, an educational module incorporating the CDC guidelines and the NJ Substance Abuse Disorder Law has the possibility to increase the adoption of these recommendations into practice while decreasing the risks related to prescription opioids.

Increased education has been shown to increase prescriber knowledge of recommended opioid prescribing guidelines as well as lead to improved patient outcomes (Alford et al., 2016; Liebshutz et al., 2017). Multiple educational interventions have sought to improve provider's knowledge about current guidelines. Alford et al. (2016), assessed provider response to a three hour long educational course that educated providers regarding the risks and benefits of opioid prescribing, while Liebshutz et al. (2017) disseminated an electronic decision tool for prescribing opioids. Alford et al.'s study, comprised of 476 clinicians licensed to prescribe opioids, demonstrated a significant increase in provider knowledge immediately after the intervention, from 60% to 84% ($p < 0.02$), and also sustained change at 2 months post intervention. At 2 months post intervention there remained a significant increase in knowledge, from 60% to 69% ($p < 0.03$). Additionally, 67% of providers reported increased confidence in safe prescribing while 86% reported that they had implemented practice changes (Alford et al., 2016). Liebshutz et al. (2017), created and disseminated an electronic opioid prescribing decision tool that when provided to prescribers, provided an algorithm for recommended safe opioid prescribing practices from initial patient assessment to initiation and discontinuation or maintenance of opioid therapy. The intervention group experienced opioid dose reduction, by a mean of 6.8 mg of morphine milligram equivalents ($p <0.001$) as well as higher opioid discontinuation rates, 21.3 % vs. 16.8 %

(Liebshutz et al., 2017). These findings reiterate the benefit of creating a synthesized educational module for prescribers.

Coffin et al., 2016 demonstrated that through the use of continued opioid prescribing education, measurable outcomes were achieved. This outcome included an increase in naloxone prescriptions, and a decrease in opioid related emergencies with the use of naloxone (Coffin et al., 2016). The study found that 38.2 % of a total of 1,985 patients on long-term opioids were prescribed naloxone post education and practice change. Of those that were prescribed naloxone, 47% ($p=0.005$) had less opioid related emergency room visits than prior to the naloxone prescription, and 63% fewer visits after one year ($p<0.001$) compared to patients who did not receive a naloxone prescription (Coffin et al., 2016). These findings further speak to the importance of the proposed project and its outcomes, which include quantifying the number of naloxone prescriptions as a measure of the educational module's success. Additionally, the translation of this evidence into clinical practice can substantially reduce prescription opioid related risks.

The importance of adhering to recommended opioid prescribing guidelines and state law is meaningfully related to decreasing the morbidity and mortality of the patients who seek treatment for chronic pain. Both the CDC guidelines and the NJ Substance Abuse Disorder law were released in response to the increasing risks related to inappropriate prescribing of opioids and the associated increase in prescription opioid related deaths. Adoption of these recommendations into clinical practice has been slow but present and the need for their use remains at an all-time high. Educational interventions have been positively correlated to increasing provider use of opioid prescribing guidelines in practice (Liebshutz et al, 2017). This finding solidifies the

project's goal of creating a synthesized educational module for primary care providers. The measurable outcomes that were discovered in the literature support the project's proposed outcomes of increased provider knowledge of guidelines and an increase in the number of naloxone prescriptions post implementation of the educational module.

Theoretical Framework

The Knowledge to Action cycle (see Appendix B), a framework constructed for evidence translation, provided the foundation for this project. The Knowledge to Action framework's central focus is the acceptance of new knowledge. The framework describes reaching this goal as a result of initial knowledge creation that leads to knowledge inquiry, knowledge synthesis, and finally the tailoring of knowledge tools with the overarching goal of adoption of new knowledge. Surrounding the central tenant of knowledge acceptance is the action cycle, the process of disseminating and applying this new knowledge (White, Dudley-Brown, & Terhaar, 2016).

The overarching premise of this project was evidence translation; disseminating evidence-based practice guidelines regarding the recommended prescribing of opioids into practice through adoption of these recommendations amongst prescribers. Therefore, the knowledge to action cycle provided an applicable framework that guided the project through creation to implementation. The cycle provided a guideline to create the project through the synthesis of knowledge of existing opioid prescribing guidelines. Next, the creation of a tailored educational tool for the audience of primary care providers, aided in easier adoption of this existing evidence. Finally, the action cycle provided a framework for the implementation, monitoring of knowledge, evaluation of outcomes, and eventual sustained use of the evidence regarding correct opioid prescribing practices.

Methodology

This quality improvement project utilized a pre- and post-design to measure an increase in provider knowledge of correct opioid prescribing practices. A pre- and post-test with identical questions was administered at the onset and completion of the educational module. Additionally, the number of Naloxone prescriptions written pre-module and post-module were obtained to assess a change in clinical practice.

Setting

The medical group has 120 locations throughout northern New Jersey comprised of a wide variety of specialties. The educational module was disseminated to all licensed independent practitioners working for the group. All employees of the group have access to an online system entitled "MyPath" where they routinely complete yearly mandatory and recommended educational modules. The opioid prescribing educational module was optional and access was made available to licensed independent prescribers through this online system.

Study population

The eligibility criteria included providers with prescriptive privileges working for the northern New Jersey medical group with access to the MyPath system. Exclusion criteria included employees without prescriptive authorities. The educational module was made available to the study population from September 17, 2018 to November 1, 2018, making this a convenience sample. Recruitment strategies included an initial email from the Medical director encouraging completion by all prescribers as well as a follow up reminder email by the investigators mid implementation. While there was a significant variation in specialties throughout the medical group, it was felt that exclusion of certain

specialties might result in inadequate educational outreach in accordance with the goal of the project. Therefore, all locations were included regardless of specialty.

Study Interventions

The study's intervention was an educational module that providers accessed via an established online system at the organization, entitled MyPath (see Appendix C). The following education regarding opioid prescribing was covered in the module:

- A brief overview of the opioid epidemic problem:
    1. 115 Americans die every day from an opioid overdose
    2. In 2015, 2 million people had an opioid use disorder
    3. 66% of drug overdoses involve an opioid
    4. The US represents only 4% of the global population but in 2015 the nation was responsible for more than 80% of the world's prescription opioid consumption
- Although these drugs are widely prescribed for chronic pain, there is insufficient evidence to support their effectiveness in pain relief and quality of life with long-term use
- Before initiating opioids, providers should:
    1. First utilize non-pharmacologic and non-opioid pharmacologic therapies
        - Exercise programs for knee and hip arthritis, low back pain, and fibromyalgia
        - Exercise community programs including local YMCA classes, silver sneakers cooperation with insurance companies for senior citizens, and low-cost options such as brisk walks in public spaces

        - Cognitive behavioral therapy should be considered to encourage patients to take an active role in their care plan, to support their engagement in physical activity, to learn to utilize relaxation techniques, and to strengthen coping strategies
        - Interventional therapies such as arthrocentesis, glucocorticoid injections, and epidural injections
    2. Non-opioid pharmacologic options
        - Acetaminophen – caution in hepatic insufficiency and alcohol abuse
        - Nonsteroidal anti-inflammatory drugs (NSAIDs) – increased cardiovascular and GI bleedings risks with high doses and longer use
        - Pregabalin, gabapentin, serotonin-norepinephrine reuptake inhibitors (SNRIs), and tricyclic antidepressants (TCAs) – for diabetic neuropathy, post-herpetic neuralgia, fibromyalgia, depression
    3. Multimodal therapy is more effective than a single modality
- Step-wise approach to pharmacologic pain therapy
    1. Step one – NSAIDs, topicals, complimentary treatments
    2. Step two – gabapentin, cyclobenzaprine, venlafaxine, duloxetine, pregabalin
    3. Step three – TCAs
    4. Step four – tramadol

5. Step five – opioids

- If the decision is made to start opioids
    1. Assess risk
        - Opioid Risk Tool to measure risk of abuse and dependence
        - Caution in: sleep disordered breathing, pregnant women, renal or hepatic insufficiency, age >/=65, mental health conditions, substance use disorder, prior nonfatal overdose
    2. Determine pain management goals
        - PEG pain screening tool to determine clinically meaningful improvement in pain
            - 30% improvement in score indicates clinically meaningful improvement
        - Patient-centered goals such as “able to walk the dog around the block” or “able to attend my child’s sporting events”
    3. Initiate opioids in conjunction with non-pharmacologic and non-opioid therapy
    4. If pain management goals are not met, inform patient that opioids will be tapered or discontinued
- What to discuss with the patient prior to starting opioid therapy
    1. Risks
        - Dependence is possible even when taken as prescribed

        - Respiratory depression when mixed with alcohol or CNS depressants or when taken at high doses (such as taking more than prescribed)
        - Danger driving or operating machinery
        - Potential for fatal overdose
    2. Discuss treatment goals
        - No evidence that opioids improve pain or function with long-term use
        - Complete resolution of pain is unlikely and improvement of function is the goal
        - If there is not meaningful improvement, opioids will be tapered and discontinued
    3. Ongoing monitoring includes the prescription drug monitoring program (PDMP) and urine drug screening
    4. Naloxone to be co-prescribed if high doses are being used
    5. Storage and disposal or medications – do not share medications, place them away from reach of children and family
    6. Reassessment of benefit versus harm every 3 months
- Prescribing opioids
    1. First prescription should not exceed 5 days for acute or chronic pain
    2. If a second prescription is warranted, provider must consult with the patient and determine if it's necessary and appropriate

3. If a third prescription is offered, the provider must enter into a pain management agreement with the patient
    - There is a pre-written consent available on the medical group's intranet
4. Important to remember:
    - Immediate release opioids should be prescribed and long acting/extended release avoided
    - Start low and go slow

- Calculating Morphine Milligram Equivalents (MME)
    - There is no single dose that eliminates overdose risk
    - Keeping the dosage <50 MME is recommended to reduce the risk among a large proportion of patients
    - Higher doses are associated with increased motor vehicle accidents (MVA), opioid use disorder, and overdose
        - Careful consideration of increasing the dosage >50 MME
        - Avoid increasing dosage to >90 MME
    - When treatment is >50 MME, increase the frequency of follow-up, offer naloxone, and provide education regarding overdose prevention
- Caring for established patients already taking high doses of opioids or transferring from other clinicians
    1. Share up-to-date evidence regarding opioids
    2. Offer to work with the patient to taper dosages

3. Create an individualized tapering plan
    - Decrease by 10% of original dose per week
    - Once the smallest available dose is reached, interval between doses can be extended
    - Tapers can be paused and restarted when patient is ready
    - Consider rapid taper for patient safety issues such as a recent overdose
    - Must discuss high risk for overdose if the patient abruptly returns to their previous dose
4. Increase the use of non-pharmacologic and non-opioid therapies
5. Considering consulting specialists: pain, orthopedic, psychotherapy

- Follow-up
    - Benefits and harms evaluation within 1-4 weeks of starting and of dose escalation
    - Minimum of every 3 months for patient on continued, unchanged therapy
        - May consider more frequent follow-up for patients on doses >50 MME
    - If the benefits do not outweigh the harms, consider tapering or discontinuing while optimizing other pain management
- Addressing Harm
1. Check PDMP – to determine opioid dosages and dangerous combinations
    - At onset

        - Every new prescription
        - Every 3 months thereafter
        - Discuss the findings with your patient
        - Do not abruptly dismiss the patient from the practice due to findings
    2. Urine drug screening – assess for prescribed or illicit drug use
        - Before starting
        - Annually
        - If concerned about the patient sharing or selling opioids
            - Check if they can be discontinued without causing withdrawal
    3. Prescribe Naloxone
        - History of overdose or substance use disorder
        - Concurrent benzodiazepine use
        - Opioid prescription > 50 MME/day
        - At risk populations (i.e. obstructive sleep apnea (OSA), chronic obstructive pulmonary disease (COPD), mental health d/o, hepatic and renal insufficiency)
    4. Substance use disorder suspected
        - Refer for treatment – methadone, buprenorphine, naltrexone, cognitive behavioral therapy (CBT)

- Additional requirements per the NJ Substance Use Disorder Law

- Practitioners are required to complete continuing education that concerns the prescribing of opioids, prescribing practices, opioid alternatives, and the risks and signs of opioid abuse
- The first 180 days of inpatient or outpatient treatment for "substance abuse disorder" must be provided by insurance companies without requiring prior authorization

Outcome measures

Throughout the literature, subjective information about the need for further knowledge regarding opioid prescribing was presented. Despite identification of the need for increased knowledge there were no validated tools found throughout the literature to objectively assess knowledge regarding opioid prescribing. Therefore, to measure knowledge, de novo questions with "true or false" answers were developed using information directly from the CDC guidelines and NJ law (see Appendix D). The pre-test and post-test were identical and were administered to participants immediately before the module and immediately after completion of the module, respectively (see Appendix C). The total score from pre- and post- tests and the change in score were used to measure the intervention's outcomes. This data was collected by the medical group's education department and then provided to and further analyzed by the project's primary investigators. The data received had employee identification numbers attached to it. The identification numbers can be linked to the employees by one person in the organization's educational department who handles the MyPath system.

Change in clinical practice was measured by evaluating the number of Naloxone prescriptions written pre- and post-educational intervention. The number of Naloxone

prescriptions written was extracted via Athena, the medical group's EMR, by the medical group's director of primary care. The data received had no patient or provider identifiers attached to it.

Benefits/Risks

The risks to study participants were minimal but included feeling uncomfortable with individual test results, known participation in the study, and the potential for identifiable test scores. Although test score results received by the researchers had no identifiable information attached to it, there was a small risk of distinguishable data. All data for analysis was de-identified. The benefit to participant included an increase in knowledge regarding opioid prescribing and, therefore, improved observance of New Jersey law and CDC guidelines. Additional benefits included the potential for a useful educational tool for New Jersey prescribers. The overarching benefit included a contribution to eradicating the opioid epidemic by decreasing opioid prescriptions and increasing opioid therapy safety through appropriate management.

Subject Recruitment

Subject recruitment began in early September 2018 with an email from the medical group's director to all overseen prescribing providers. The email encouraged providers to take the educational module regarding opioid prescribing that was made available to access in their MyPath system. Following the introductory email, the researchers sent a reminder email, further encouraging providers to complete the module (see Appendix E).

Consent Procedures

The participation consent was included on the first slide of the educational module (see Appendix F for consent).

Project Timeline

See Appendix G for Gantt chart of the project's timeline.

Evaluation Plan

Data Maintenance/Security

The data from the educational module, including responses to the pre- and post-test were stored within an electronic data repository accessible solely by the education department. The investigators were given a report of the answers to the pre- and post-test, with the educational department identification numbers. The number of Naloxone prescriptions written pre- and post-intervention were also provided with no patient identifiers. The medical director collected this data and provided the data to the investigators in a report derived from the electronic medical record, Athena. The report solely consisted of the number of Naloxone prescriptions, devoid of any patient or prescriber identifiers.

Data Analysis

After completion of the educational intervention it was determined that the collected data did not follow a normal distribution, therefore a nonparametric Wilcoxon Rank Sum test was used to determine a statistically significant difference in mean pre and post test scores (see Appendix H for histograms).

Results

The module was available to 379 prescribers (N=379). A total of 79 prescribers viewed the educational module. Of these, 10 prescribers did not complete the post-test

and were excluded from the analysis as outliers. Of the 69 prescribers included in analysis (n=69), 35 were physicians (51%), 28 were advanced practice nurses (41%), and 6 were physician's assistants (9%). See table 1.

Table 1. Project sample demographics

Total N=69	N	%
Physicians	35	51%
Advanced practice nurses	28	41%
Physician assistants	6	9%

The difference in mean knowledge scores pre and post intervention was analyzed using non-parametric Wilcoxon Signed Rank test, because mean scores were not normally distributed. The pre-test median knowledge score was 43 and post-test median was 86. The pre-test mean score was 44.8 and the post-test mean score was 78.1, with a mean difference in scores was 33.3. The mean difference was statistically significant ($p < 0.000$), meaning that the difference in scores occurred due to the intervention and not by chance alone . See table 2.

Table 2. Knowledge scores pre and post intervention

	Mean score	Median scores	Mean difference, p-value
Pre-test	44.8	43	
Post-test	78.1	86	
			33.3 ($p< 0.000$)

The number of naloxone prescriptions written were extracted from the medical group's EMR and provided to investigators. A total of five prescriptions for naloxone were written in 2018. Prior to implementation of the education module, from January to August 2018, zero prescriptions were written for Naloxone. In October, during the module's implementation period, 3 Naloxone prescriptions were written.

Limitations

The analysis of pre- and post-test data was limited to evaluation of total test scores due to constraints of the module's platform. These constraints prevented the investigators from viewing the way that participants responded to the questions. This limited an analysis of deficiencies and strengths, and therefore limited the ability of the investigators to identify areas that may need to be addressed in future interventions.

Additionally, when analyzing naloxone prescriptions, investigators were unable to determine if prescribers who had completed the educational module were those who wrote the Naloxone prescriptions. This limited the ability of the investigators to determine a causal relationship between the educational module and a change in practice.

Finally, a reliable test to assess for opioid prescribing knowledge was unavailable and therefore the pre- and post- test questions were created de novo by the primary investigators. While the "true or false" questions were based on published CDC guidelines and the New Jersey Substance Abuse Disorder Law, the test questions have not been tested for reliability.

Discussion

The principle goal of this quality improvement project was to improve provider knowledge regarding best opioid prescribing practices according to the CDC's guidelines

for prescribing opioids for chronic pain and the NJ Substance Abuse Disorder Law. Throughout the literature it was determined that a knowledge deficit exists regarding opioid prescribing, that there is a need for further provider education, and that provider education on recommended opioid prescribing practices has demonstrated improved patient outcomes. This quality improvement project demonstrates that a knowledge deficit on recommended opioid prescribing practices does exist in this Northern New Jersey medical group (pre-test mean score 44.8). The project also found a statistically significant ($p<0.000$) increase in test scores after completion of the educational module, indicating an increase in provider knowledge.

The results of this project have many implications for provider education. Current guidelines and law are lengthy and cumbersome, making their adoption and use in practice difficult. The module synthesized this content into a streamlined educational intervention, with a measurable increase in knowledge after its completion. This module serves as an example of the usefulness of a concise educational reference for prescribers. Throughout the literature it was noted that an increase in knowledge was correlated with safer prescribing practices. Adoption of the educational module for further knowledge enhancement may aid prescribers in changing their practice to abide by recommended guidelines and law.

Safety implications of this project are related to the resultant impact that increased knowledge of recommended opioid prescribing has on clinical practice. As seen and discussed in the literature, increased knowledge of recommended opioid prescribing practices has resulted in improved patient outcomes. While the project was unable to draw a causal relationship between increased education and a change in practice, the

increase in provider knowledge has the capacity to translate into safer prescribing practices by those who completed the intervention. More specifically, following the recommended prescribing practices will result in decreased incidence of opioid abuse disorder and overdoses.

Implications for healthcare quality are vast and include the improvement and enhancement of pain management in clinical practice. The educational intervention provides synthesized best practice recommendations for clinicians to incorporate into practice and therefore a foundation for improved practice. If further adoption of the educational content occurs by providers who took part in the intervention, a resulting improvement in proper management of chronic pain may occur.

From an economic standpoint, the increased knowledge demonstrated through this project can have an indirect economic benefit by decreasing substance abuse disorder costs and the resulting lack of productivity. Improper pain management and high doses of opioids from chronic pain also incur high economic costs due to lack of productivity and the inability to work. Increased opioid prescribing education that leads to a change in practice can decrease the occurrence of such disorders.

The findings of the project provide a foundation for future research. Further research should focus on changes in clinical practice and patient outcomes in relation to increased provider knowledge. It would be beneficial to assess whether increased provider knowledge of recommended opioid prescribing practices are in any way correlated to a decrease in chronic pain, death, or disability. Research should also focus on measuring the number of naloxone prescriptions written, in what context they were prescribed, and if they were co-prescribed with a prescription for an opioid. In addition,

assessing whether the knowledge learned from the educational intervention is sustainable over a period of time would aid in reinforcing the need for annual or more frequent mandatory education. Finally, research should focus on analyzing the relationship between system outcomes and provider knowledge to see if increased provider education decreases healthcare costs.

Plans for Future Scholarship

The educational module created for this quality improvement project can be translated to a broader setting due to its ease of use and adaptability. The educational module can be altered to a pocket size reference for prescribers to use in everyday practice. The information synthesized in the educational module is nationally recognized by the CDC and relevant to all practice settings within New Jersey facing opioid prescribing in accordance with NJ State Law.

The results of the project will be disseminated to both the director of the New Jersey medical group as well as the director of the education department. It is our hope that the medical group will accept the educational intervention for future educational purposes. Additionally, it is the hope of both investigators to translate the knowledge gained through this process into personal clinical practice and to function as a resource to professional colleagues to increase patient safety.

Conclusion

The overarching goal of this project was to increase provider knowledge of opioid prescribing guidelines and law. Through increased knowledge of correct opioid prescribing, prescribers will have the capability to practice evidence-based medicine and resultantly enhance healthcare quality.

References

Alford, D. P., Zisblatt, L., Hardesty, I., White, J. L., Ng, P., Hayes, S. M., & Peloquin, S. (2016). SCOPE of pain: An evaluation of an opioid risk evaluation and mitigation strategy continuing education program. Pain Medicine (United States), 17(1), 52-63. doi:10.1111/pme.12878

Canadian Institutes of Health Research. (2015). Knowledge translation in health care: Moving from evidence to practice. Retrieved from http://www.cihr-irsc.gc.ca/e/40618.html.

Center for Disease Control and Prevention. (2017). Drug Overdose Death Data. Retrieved from https://www.cdc.gov/drugoverdose/data/statedeaths.html

Center for Disease Control and Prevention. (2017). Prescription Opioids. Retrieved from https://www.cdc.gov/drugoverdose/opioids/prescribed.html

Centers for Disease Control and Prevention. (2017). Prescription Opioid Overdose Data. Retrieved from https://www.cdc.gov/drugoverdose/data/overdose.html

Center for Disease Control and Prevention. (2017). Prescription Opioid Overdose Death Data. Retrieved from https://www.cdc.gov/drugoverdose/data/overdose.html

Center for Disease Control and Prevention. (2017). Understanding the Epidemic. Retrieved from https://www.cdc.gov/drugoverdose/epidemic/index.html

Center for Disease Control and Prevention. (2017). U.S. Prescribing Rate Maps. Retrieved from https://www.cdc.gov/drugoverdose/maps/rxrate-maps.html

Coffin, P. O., Behar, E., Rowe, C., Santos, G.-M., Coffa, D., Bald, M., & Vittinghoff, E. (2016). Nonrandomized Intervention Study of Naloxone Coprescription for

Primary Care Patients Receiving Long-Term Opioid Therapy for Pain. *Annals of Internal Medicine, 165*(4), 245-252. doi:10.7326/M15-2771

Daubresse, M., Viswanathan, S., Alexander, G. C., Yu, Y., Chang, H. Y., Shah, N. D., . . . Kruszewski, S. P. (2013). Ambulatory diagnosis and treatment of nonmalignant pain in the united states, 2000-2010. *Medical Care, 51*(10), 870-878. doi:10.1097/MLR.0b013e3182a95d86

Dowell, D., Haegerich, T. M., & Chou, R. *CDC Guideline for Prescribing Opioids for Chronic Pain - United States, 2016*.

Guy Jr., G. P., Kun, Z., Bohm, M. K., Losby, J., Lewis, B., Young, R., & ... Zhang, K. (2017). Vital signs: Changes in opioid prescribing in the United States, 2006-2015. MMWR: Morbidity & Mortality Weekly Report, 66 (26), 697-704. doi:10.15585/mmwr.mm6626a4

Kanouse, A. B., & Compton, P. (2015). The Epidemic of Prescription Opioid Abuse, the Subsequent Rising Prevalence of Heroin Use, and the Federal Response. *Journal of Pain & Palliative Care Pharmacotherapy, 29*(2), 102-114 113p. doi:10.3109/15360288.2015.1037521

Kennedy-Hendricks, A., Busch, S. H., McGinty, E. E., Bachhuber, M. A., Niederdeppe, J., Gollust, S. E., . . . Barry, C. L. (2016). Full length article: Primary care physicians' perspectives on the prescription opioid epidemic. *Drug and Alcohol Dependence, 165*, 61-70. doi:10.1016/j.drugalcdep.2016.05.010

Liebschutz, J. M., Ziming, X., Shanahan, C.W., LaRochelle, M., Keosaian, J., Beers, D., & ... Xuan, Z. (2017). Improving adherence to long-term opioid therapy guidelines to reduce opioid misuse in primary care: A cluster-randomized clinical

trial. JAMA Internal Medicine, 177 (9), 1265-1272. doi:10.1001/jamainternmed.2017.2468

Macerollo, A. A., Mack, D. O., Oza, R., Wallace, L. S., & Bennett, I. M. (2014). Academic family medicine physicians' confidence and comfort with opioid analgesic prescribing for patients with chronic nonmalignant pain. *Journal of Opioid Management, 10*(4), 255-261. doi:10.5055/jom.2014.0213

New Jersey Substance Abuse Disorder Law. (2017) P.L. Chapter 28.

Nuckols, T. K., Anderson, L., Popescu, I., Diamant, A. L., Doyle, B., Di Capua, P., & Chou, R. (2014). Opioid prescribing: a systematic review and critical appraisal of guidelines for chronic pain. Annals Of Internal Medicine, 160(1), 38-47. doi:10.7326/0003-4819-160-1-201401070-00732

Pearson, A. C. S., Eldrige, J. S., Moeschler, S. M., & Hooten, W. M. (2016). Opioids for chronic pain: a knowledge assessment of nonpain specialty providers. *Journal of Pain Research, Vol 2016, Iss Issue 1, Pp 129-135 (2016)*(Issue 1), 129.

Pearson, A.C., Moman, R.N., Moeschler, S.M., Eldrige, J.S., & Hooten, W.M. (2017). Provider confidence in opioid prescribing and chronic pain management: Results of the Opioid Therapy Provider Survey. Journal of Pain Research, 10, 1397-1400.

White, K.M., Dudley-Brown, S., Terhaar, M.F. (2016). *Translation of evidence into nursing and health care.* New York, NY: Springer Publishing Company.

Appendix A

Table of Evidence

Article #	**First author, year of publication, & title**	**Evidence Type**	**Sample, Sample Size, & Setting**	**Study findings that help answer the EBP question**	**Limitations**	**Evidence Level & Quality**
#1	Macerollo, 2014, Academic family medicine physicians' confidence and comfort with opioid analgesic prescribing for patients with chronic nonmalignant pain.	Research (non-experimental descriptive survey)	-Sample of active academic US family physicians (n=491); 57.8% male, 84.1% non-Hispanic white -Electronic cross-sectional survey – part of the larger Council of Academic Family Medicine Survey	- The majority report being "somewhat" or "strongly" comfortable and confident in prescribing opioids - Nearly two-thirds were concerned about negative patient outcomes and noncompliance - Findings show the need for continued education and training in chronic pain management	- Sample of academic family physicians performing patient care on a less than full-time basis; however, also means that the attitudes and practices of these academic physicians will likely shape the practice behaviors of their students - Subjective - Does not mean that prescribing practices were safe or effective	Level III, Quality B
#2	Coffin, 2016, Non-randomized intervention study of naloxone co-prescription for primary care patients receiving long-term opioid therapy for pain	Research (quasi-experimental)	1.985 adults receiving long-term opioids for pain at 6 safety-net primary care clinics in San Francisco	- Six months after the intervention patients who received naloxone had 47% fewer opioid-related emergency department visits per month and 63% fewer visits after 12 months - 38.2% of the 1,985 patients were prescribed	- Observational study, cannot infer causality - Data does not confirm whether naloxone prescription was filled - Results may not be generalizable outside of safety-net clinical care	Level II, Quality B

				naloxone; those more likely to receive the prescription were those on higher doses and those with an emergency department related visit within the last 12 months	settings	
#3	Kennedy-Hendricks, 2016, Primary care physicians' perspectives on the prescription opioid epidemic	Research (non-experimental survey)	1.023 physicians who participated in the U.S. survey research firm from a national panel of 90,000 U.S. physicians was utilized	- The majority of primary care physicians supported (1) monitoring or restricting prescribing opioids among potentially at-risk patients and (2) improved physician training and education on the treatment of chronic pain as solutions to prescription opioid use disorder	- Sample was from a large national panel but completion rate was low (29%) - Pediatricians made up 1/3 of sample	Level III, Quality B
#4	Dowell, 2016, CDC guideline for prescribing opioids for chronic pain – United States	Non-Research, Guideline	N/A	- Illustrates 12 recommended guidelines providers should adhere to: 1. Nonpharmacological and non-opioid pharmacologic therapy are preferred for chronic pain. Opioids should be combined with	N/A	Level IV, Quality A

				other therapies if they are used. 2. Before starting opioids, goals of treatment should be established and should only be continued if there is meaningful improvement. 3. Discuss known risks and realistic benefits of therapy before starting and during therapy. 4. If starting, prescribe immediate release rather than extended release formulas 5. Start with the lowest effective dose. Reassess benefit when dosage exceeds > 50 MME/day and avoid exceeding 90 MME/day 6. When prescribed for acute pain, prescribe lowest dose for no greater than needed for expected pain episode (usually 3 days is enough, >7 days is rarely needed) 7. Evaluate at 1-4 weeks after starting therapy or for any dose escalation. See patients every 3		

				months to reevaluate need for therapy. 8. Evaluate risk factors for opioid related harms such as overdose. Consider offering naloxone when high risk. 9. Review prescription drug monitoring program (PDMP) 10. Urine drug screening before starting and consider it at least annually to assess for the prescribed medications or other illicit drug use. 11. Avoid prescribing opioids and benzodiazepines concurrently. 12. Offer or arrange treatment for those suffering from opioid addiction.		
#5	Alford, 2016, SCOPE of Pain: An Evaluation of an Opioid Risk Evaluation and Mitigation Strategy Continuing Education Program	Research (quasi-experimental)	2,850 clinicians licensed to prescribe opioid analgesics completed the SCOPE of Pain program, a 3-hour program that covers the FDA blueprint	- Pre, immediately post, and 2-month post assessments were assessed - Immediately post, there was improved knowledge about guidelines and intention to change their practice with guideline-based	- Assessments were self-reported, unknown if clinical practice truly changed - Voluntary program so those that took the course were likely more motivated to change their practice	Level II, Quality B

				recommendations - 2- month assessment: revealed improved knowledge from pre-assessment, increased confidence in opioid prescribing since the intervention, and clinical practice changes in line with guideline recommendations		
#6	Pearson, 2016, Opioids for chronic pain: a knowledge assessment of non-pain specialty providers	Research (non-experimental, survey)	131 participants recruited at a pain-focused continuing medical education conference for non-pain specialists	- Demonstrated a knowledge gap about the use of opioids for chronic pain based on lower scores of clinically based opioid questions - Demonstrates need for educational module for non-pain providers	- Participants were there to attend a pain-focused continuing educational conference for non-pain specialists -These providers more likely to have a knowledge gap	Level III, Quality B
#7	Guy et al., 2017, Vital signs: Changes in opioid prescribing in the United States, 2006-2015	Research (non-experimental, observational)	Sample-59,000 pharmacies in the US, representing 88 % of prescriptions	- Quantifies the continued increase in opioid prescriptions at a national level - Average daily prescription increased 33% from 2006 to 2015 - Overall reduction in opioid prescribing from 2006 to 2015, but amount still remains high	- Quintile estimates (way prescriptions were quantified) have not been validated - Do not include prescriptions dispensed directly by providers - County level data cannot account for prescriptions	Level III, Quality B

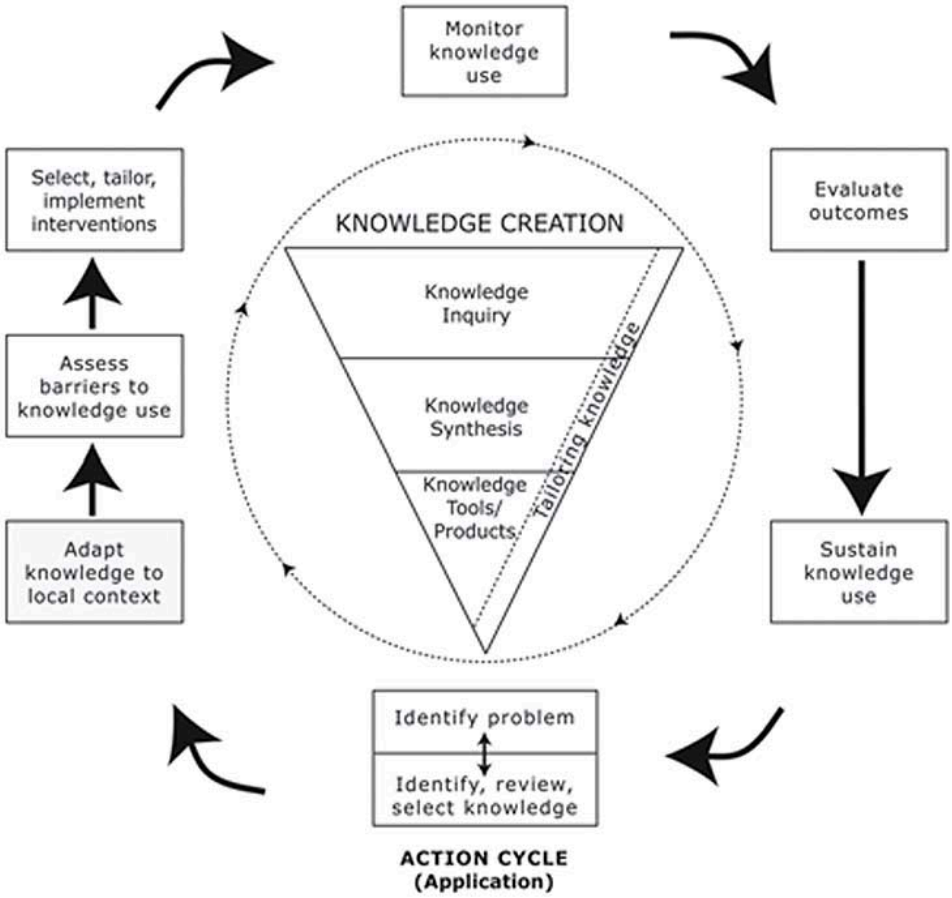
				compared to 1999 (3x as high MME, 4x as high as Europe) - Prescribing changes seen: 1. Average daily MME per prescription decreased (after release of two guidelines defining high dose opioids & risk of overdose) 2. Rate of opioid prescribing decreased nationwide by 13.3 % (increased physician awareness at time) 3. However average duration of opioid rx increased >30 days (this finding largely deviates from CDC guidelines) 4. PDMP mandated monitoring was associated with large decrease in MME per capita in Ohio and Kentucky	filled outside of the county - No clinical outcomes analyzed - No data regarding indication for opioid prescription	
#8	Pearson et al., 2017, Provider confidence in opioid prescribing and chronic pain	Research (non-experimental, survey)	- CME conference - Cohort= 69 MD's, PA's, and NP's	- Majority of providers felt treating pain patients is a problem in primary care setting - Providers feel	- Participants were already attending an opioid conference so could have been interested in changing their	Level III, Quality B

	management : results of the Opioid Therapy Provider Survey			treating patients with opioids may cause them to become addicted, did not follow an opioid protocol, & lacked confidence prescribing opioids - Providers who felt comfortable stated they followed a protocol	opioid prescribing practices - No evaluation of competence of prescribing or adherence with guidelines or actual outcomes	
#9	Liebshutz et al., 2017, Improving adherence to long-term opioid therapy guidelines to reduce opioid misuse in primary care: A cluster-randomized clinical trial	Research (RCT)	- Setting-Four urban primary care offices in Boston - Sample-included 53 primary care clinicians (MDs or NPs) who had greater than 4 patients on chronic opioid therapy	- Group randomized to opioid education intervention increased provider adherence to guideline concordant care - Higher rates of a signed patient agreement, greater number of opioid discontinuations, and a greater reduction in MME doses in intervention group	- Study used the EHR as sole data collection method (kept from analyzing patient's actual experience related to the intervention) - The EHR also did not have accurate mental health or abuse disorder data - Unclear whether dose reduction was due to increased fear or more cautious monitoring	Level I, Quality B
#10	NJ Substance Abuse Disorder Law (2017)	Non-research	N/A	- According to the law, prescribers are required to discuss and explain risks associated with opioids - Prescribers are required to offer alternative treatment options	N/A	Level IV

				- Prescribers are required to develop a treatment plan - Reiterates the importance of prescriber education and adherence to the law's recommended guidelines		
#11	Nuckols et al., 2014, Opioid prescribing: a systematic review and critical appraisal of guidelines for chronic pain	Research (systematic review)	- Guidelines regarding use of opioids for chronic pain written between 2007-2013	- Findings indicate the importance of risk mitigation strategies in opioid therapy (use of treatment agreements, urine drug testing) - Guidelines generally agreed that there is a need for caution and understanding in opioid prescribing	- Exclusion of non-english guidelines - Only guidelines available to the public were accessible	Level II, Quality B

Appendix B

Knowledge to Action Cycle



(Canadian Institutes of Health Research, 2015)

Appendix C

The Educational Module

An Opioid Prescribing Educational Module

Pre- and post- test are unidentifiable, and are for research purposes only

Researchers: Erin Acker & Jaclyn Vinagre, DNP candidates

Consent for Participation

The purpose of this research study is to increase prescriber knowledge of current opioid prescribing guidelines recommended by the CDC and NJ State Law. You are being asked to take part in a research study because you are a prescriber within the Valley Medical Group.

Being in a research study is completely voluntary. You can choose not to be in this research study. You can also say yes now, and change your mind later. Deciding not to be in the research study, now or later, will not affect your ability to receive medical care at The Valley Hospital.

If you agree to take part in this research, you will be asked to take part in a pre- and post- test and review a My Path educational module. Your participation in this study will take about five to ten minutes. We expect that 50 people will take part in this research study.

You can choose not to take the module. You can also choose to exit the module at any time. You must be at least 18 years old to participate. If you are younger than 18 years old, please stop now.

The possible risks to you in taking part in this research are:

§ Feeling uncomfortable, having someone else find out that you were in a research study, and potential loss of confidentiality of data.

The possible benefits to you for taking part in this research are:

§ Increased knowledge of both the CDC guidelines for prescribing opioids for chronic pain and the NJ Substance Abuse Disorder Law

To protect your identity as a research subject, no identifiable information will be collected, the research data will not be stored with your name, the researcher will not share your information with anyone. In any publication about this research, your name or other private information will not be used.

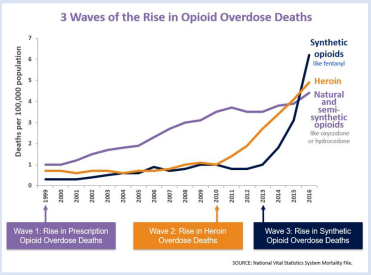
If you have any questions about this research, please contact the Researcher at 862-268-2693 or 201-359-7557. You can also call the IRB of record of this study, Western IRB at 360-252-2500.

Pre-Test

1. It is recommended to prescribe opioids at < 60 MME/day. True or **False**?
2. Urine drug screening should be performed at onset of opioid therapy and annually. **True** or False?
3. Opioids should be started in combination with non-pharmacologic and non-opioid therapies. **True** or False?
4. The PEG screening tool measures risk of abuse and dependence. True or **False**?
5. Naloxone should be prescribed to high risk patients (prior overdose, sleep disordered breathing, concurrent benzodiazepine use, renal or hepatic insufficiency). **True** or False?
6. Providers should enter into a pain management contract with their patient after the second prescription of opioids is written. True or **False**?
7. If the joint decision is made to taper off of opioids, the dose should be decrease by 20% of the original weekly dose. True or **False**?

The problem

- 115 Americans die every day from an opioid overdose
- In 2015, 2 million people had an opioid use disorder
- In 2016, 66% of drug overdoses involve an opioid
- The United States represents only 4% of the global population but in 2015 the nation was responsible for more than 80% of the world's prescription opioid consumption
- There is insufficient evidence to determine whether pain relief and quality of life improves with long-term opioid therapy



(CDC, 2017; Dowell et al., 2016; Kanouse & Compton, 2015; NJ Substance Abuse Disorder Law, 2017)

Before initiating opioids

- 1st line – Nonpharmacologic and non-opioid therapies
  - **Exercise programs (PT)**
    - Knee and hip OA
    - Low back pain
    - Fibromyalgia
  - **Exercise community program** options:
    - YMCA (Ridgewood, Wayne)
    - Silver sneakers covered by some insurance companies for seniors
    - Low cost options - brisk walking in public spaces (park, mall)
  - **Cognitive behavioral therapy**
    - Encourages patient to take active role in their care plan, supports their engagement in activity, utilizes relaxation techniques, and strengthens coping strategies
  - **Interventional** – arthrocentesis, glucocorticoid injections, epidural injections
  - **Non-opioid pharmacological** –
    - Acetaminophen – Must take caution in hepatic insufficiency or alcohol abuse
    - NSAIDs – have increased cardiovascular risks and gastrointestinal bleeding at higher doses or longer use
    - Pregabalin, gabapentin, SNRIs, TCAs – diabetic neuropathy and post-herpetic neuralgia, fibromyalgia, depression
- **Multimodal therapy** is more effective than single modality

(Dowell et al., 2016; NJ Substance Abuse Disorder Law, 2017)

Step-wise approach to Pharmacological therapy

Step 1

NSAIDs

Topicals

Complimentary Treatments

Step 2

Gabapentin

Cyclobenzaprine

Venlafaxine

Duloxetine

Pregabalin

Step 3

TCAs

Step 4

Mild opioids: Tramadol

Step 5

Opioids

(Dowell et al., 2016; NJ Substance Abuse Disorder Law, 2017)

Decision made to start opioids

1. Assess risk
   - Opioid Risk Tool (ORT) to measure risk of abuse and dependence
   - Caution in:
     - Disease with sleep disordered breathing (CHF, OSA)
     - Pregnant women
     - Renal or hepatic insufficiency
     - Aged >/= 65
     - Mental health conditions (increased risk for opioid use disorder in pt with depression, anxiety disorders, PTSD)
     - Substance use disorder
     - Prior nonfatal overdose
2. Determine pain management goals
   - PEG pain screening tool to determine clinically meaningful improvement in pain
     - >/= 30% improvement in score
   - Patient-centered goals
     - "able to walk the dog around the block" or "able to attend child's sporting event"
3. Initiate **in conjunction with** non-pharmacologic and non-opioid therapy
4. If pain management goals are not met, inform patients that opioids will be tapered or discontinued

(Dowell et al., 2016; NJ Substance Abuse Disorder Law, 2017)

Opioid Risk Tool

This tool should be administered to patients upon an initial visit prior to beginning opioid therapy for pain management. A score of 3 or lower indicates low risk for future opioid abuse, a score of 4 to 7 indicates moderate risk for opioid abuse, and a score of 8 or higher indicates a high risk for opioid abuse.

Mark each box that applies	Female	Male
Family history of substance abuse		
Alcohol	1	3
Illegal drugs	2	3
Rx drugs	4	4
Personal history of substance abuse		
Alcohol	3	3
Illegal drugs	4	4
Rx drugs	5	5
Age between 16—45 years	1	1
History of preadolescent sexual abuse	3	0
Psychological disease		
ADD, OCD, bipolar, schizophrenia	2	2
Depression	1	1
Scoring totals		

PEG Pain Screening Tool

1. What number best describes your pain on average in the past week:

0 1 2 3 4 5 6 7 8 9 10

No pain — Pain as bad as you can imagine

2. What number best describes how, during the past week, pain has interfered with your enjoyment of life?

0 1 2 3 4 5 6 7 8 9 10

Does not interfere — Completely interferes

3. What number best describes how, during the past week, pain has interfered with your general activity?

0 1 2 3 4 5 6 7 8 9 10

Does not interfere — Completely interferes

To compute the PEG score, add the three responses to the questions above, then divide by three to get a final score out of 10.

The final PEG score can mean very different things to different patients. The PEG score, like most other screening instruments, is most useful in tracking changes over time. The PEG score should decrease over time after therapy has begun.

What to discuss with your patient before starting opioid therapy

1. Risks:
   - Dependence is possible even when taken as prescribed
   - Respiratory depression when mixed with alcohol or CNS depressants or when taken at high doses (taking more than prescribed)
   - Danger driving or operating machinery
   - Potential for fatal overdose
2. Discussion of **treatment goals**
   - There is no evidence that opioids improve pain or function with long-term use
   - Complete resolution of pain is *unlikely* and improvement of function is the goal
   - If there isn't meaningful improvement, opioids will be tapered and discontinued
3. Ongoing monitoring: use of PDMP and urine drug screening – discussed to reduce mistrust later on
4. Use of overdose antidotes – Naloxone – to be co-prescribed if using high doses
5. Storage and disposal of medications – do not share medication, place away from reach of children and family
6. There will be a reassessment of benefit versus harm every 3 months

(Dowell et al., 2016; NJ Substance Abuse Disorder Law, 2017)

Prescribing Opioids

1. **First prescription** should not exceed 5 days for acute OR chronic pain
2. If a **second prescription** is warranted, the practitioner must consult with the patient & determine if it is necessary and appropriate & will not present a risk of abuse or addiction
3. If a **third prescription** is offered, the provider must enter into a pain management agreement with the patient
   - VMG pre-written consent available (Valley intranet -> go to medical staff tab -> physician's orders and forms -> click on "informed consent and agreement for controlled substances")

- **Remember:**
  - **Immediate release opioids should be prescribed, not long acting/extended release opioids**
  - **Start low and go slow**
  - **Avoid co-prescribing benzodiazepines**

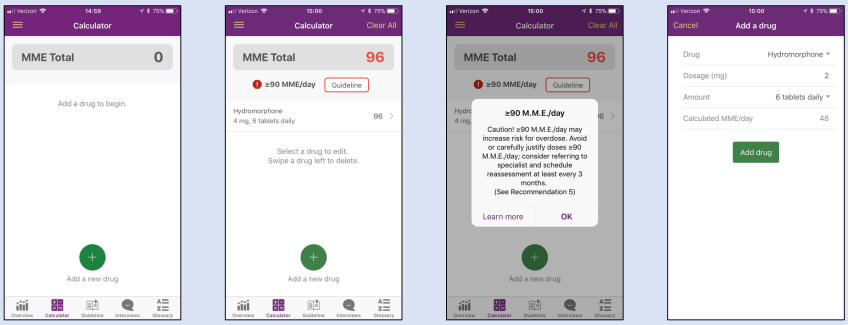
(Dowell et al., 2016; NJ Substance Abuse Disorder Law, 2017)

Calculating Morphine Milligram Equivalents (MMEs)

- No single dose that eliminates overdose risk
- Keeping dosage <50 MME is recommended to likely reduce risk among large proportion of patients
- Higher doses are associated with increased MVA, opioid use disorder, and overdose
  - Careful consideration of increasing dosage to >50 MME/day
  - Avoid increasing dosage to >90 MME/day and carefully justify this decision
- When treatment >50 MME/day:
  - Increase frequency of follow-up
  - Offer **naloxone** and provide education regarding overdose prevention

(Dowell et al., 2016; NJ Substance Abuse Disorder Law, 2017)

CDC Opioid Prescribing Guideline Mobile Application to quickly & easily calculate MME's



Established patients already taking high doses of opioids/transferring from other clinicians

1. Share up-to-date evidence regarding opioids
2. Offer to work with patient to taper to lower dosages
   - Anxiety provoking, provide emotional support
3. Create an individualized tapering plan
   - Decrease by 10% of original dose per week (patient taking 8 mg of hydromorphone per day = 56 mg/week; taper by 5 or 6 mg/week)
   - Once smallest available dose is reached, interval between doses can be extended
   - Tapers can be paused and restarted when patient is ready to resume again
   - Consider rapid taper for patient safety issues (recent overdose)
   - MUST discuss high risk for overdose if the patient abruptly returns to their previous dose
4. Increase use of non-pharmacologic and non-opioid therapies
5. Consider consulting specialists: pain, orthopedic, psychotherapy

(Dowell et al., 2016; NJ Substance Abuse Disorder Law, 2017)

Follow-up

- Benefits and harms evaluation within 1-4 weeks of **starting** and **dose escalation**
- Minimum of every 3 months for patient on continued, unchanged therapy
  - May consider more frequent follow-up for patient on high doses (>50 MME)
- If benefits do not outweigh harms, consider tapering or discontinuing while optimizing other pain management (non-opioid, non-pharmacologic)

(Dowell et al., 2016; NJ Substance Abuse Disorder Law, 2017)

Addressing Harm

1. Check PDMP – determine opioid dosages and dangerous combinations
   - At onset
   - Every new prescription
   - Every 3 months thereafter
   - Discuss findings with patient
   - Do not abruptly dismiss patient from practice due to findings
2. Urine drug screening – assess for prescribed or illicit drug use
   - Before starting
   - Annually
   - If concerned about the patient sharing or selling opioids
     - Check if they can be discontinued without causing withdrawal
3. Prescribe Naloxone
   - History of overdose or substance use disorder
   - Concurrent benzodiazepine use
   - Opioid prescriptions > 50 MME/day
   - At risk populations previously mentioned (i.e. OSA, COPD, mental health d/o, hepatic and renal insufficiency)
4. Substance use disorder suspected
   - Refer for treatment – methadone, buprenorphine, naltrexone & CBT

(Dowell et al., 2016; NJ Substance Abuse Disorder Law, 2017)

Additional requirements per the NJ Substance Abuse Disorder Law

- Practitioners are required to complete **continuing education** that concerns the prescribing of opioids, prescribing practices, opioid alternatives, & the risks and signs of opioid abuse
  - 1 CME for physicians and physician assistants biennial
  - 6 contact hours for advanced practice nurses upon initial and recertification
- The **first 180 days** of inpatient or outpatient treatment for “substance abuse disorder” must be provided without requiring prior authorization
  - If an in-network facility is unavailable, insurance carriers must provide one within 24 hours
  - All prescription drugs used to treat a substance abuse disorder shall be covered by a carrier without prior authorization

(Dowell et al., 2016; NJ Substance Abuse Disorder Law, 2017)

References

Center for Disease Control and Prevention. (2017). Understanding the Epidemic. Retrieved from https://www.cdc.gov/drugoverdose/epidemic/index.html

Dowell, D., Haegerich, T. M., & Chou, R. *CDC Guideline for Prescribing Opioids for Chronic Pain - United States, 2016*.

Kanouse, A. B., & Compton, P. (2015). The Epidemic of Prescription Opioid Abuse, the Subsequent Rising Prevalence of Heroin Use, and the Federal Response. *Journal of Pain & Palliative Care Pharmacotherapy, 29*(2), 102-114 113p. doi:10.3109/15360288.2015.1037521

New Jersey Substance Abuse Disorder Law. (2017) P.L. Chapter 28.

Post-Test

1. It is recommended to prescribe opioids at < 60 MME/day. True or **False**?
2. Urine drug screening should be performed at onset of opioid therapy and annually. **True** or False?
3. Opioids should be started in combination with non-pharmacologic and non-opioid therapies. **True** or False?
4. The PEG screening tool measures risk of abuse and dependence. True or **False**?
5. Naloxone should be prescribed to high risk patients (prior overdose, sleep disordered breathing, concurrent benzodiazepine use, renal or hepatic insufficiency). **True** or False?
6. Providers should enter into a pain management contract with their patient after the second prescription of opioids is written. True or **False**?
7. If the joint decision is made to taper off of opioids, the dose should be decrease by 20% of the original weekly dose. True or **False**?

Appendix D

Pre- and Post- Test

1. It is recommended to prescribe opioids at < 60 MME/day. True or **False**?
2. Urine drug screening should be performed at onset of opioid therapy and annually. **True** or False?
3. Opioids should be started in combination with non-pharmacologic and non-opioid therapies. **True** or False?
4. The PEG screening tool measures risk of abuse and dependence. True or **False**?
5. Naloxone should be prescribed to high risk patients (prior overdose, sleep disordered breathing, concurrent benzodiazepine use, renal or hepatic insufficiency). **True** or False?
6. Providers should enter into a pain management contract with their patient after the second prescription of opioids is written. True or **False**?
7. If the joint decision is made to taper off opioids, the dose should be decrease by 20% of the original weekly dose. True or **False**?

Appendix E

Introductory and Follow-Up Emails for Recruitment

The United States is currently facing an opioid epidemic and healthcare providers are at the forefront of the movement to eradicate the significant morbidity and mortality that this epidemic has incurred. The 2017 New Jersey Substance Abuse Disorder Law and the 2016 CDC guidelines for prescribing opioids for chronic pain are excellent resources guiding correct and safe clinical practice.

A MyPath module synthesizing the information from this law and guideline has been created as an educational resource for correct opioid prescribing practices. The module is completely voluntary; however, I strongly encourage you to complete the two Opioid Prescribing MyPath modules that have been assigned to you. The order in which you complete the modules does matter; please complete Part One first and Part Two last. The entire process will take you no longer than 10-15 minutes to complete.

Appendix F

Consent for participation

Title: An Educational Module to Improve Provider Knowledge of Recommended Opioid Prescribing Practices

Researchers: Erin Acker, RN, BSN, DNP candidate

[redacted]

The purpose of this research study is to increase prescriber knowledge of current opioid prescribing guidelines recommended by the CDC and NJ State Law. You are being asked to take part in a research study because you are a prescriber within the [redacted].

Being in a research study is completely voluntary. You can choose not to be in this research study. You can also say yes now, and change your mind later. Deciding not to be in the research study, now or later, will not affect your ability to receive medical care at [redacted].

If you agree to take part in this research, you will be asked to take part in a pre- and post- test and review a My Path educational module. Your participation in this study will take about five to ten minutes. We expect that 50 people will take part in this research study.

You can choose not to take the module. You can also choose to exit the module at any time. You must be at least 18 years old to participate. If you are younger than 18 years old, please stop now.

The possible risks to you in taking part in this research are:

- Feeling uncomfortable, having someone else find out that you were in a research study, and potential loss of confidentiality of data.

The possible benefits to you for taking part in this research are:

- Increased knowledge of both the CDC guidelines for prescribing opioids for chronic pain and the NJ Substance Abuse Disorder Law

To protect your identity as a research subject, no identifiable information will be collected, the research data will not be stored with your name, the researcher will not share your information with anyone. In any publication about this research, your name or other private information will not be used.

If you have any questions about this research, please contact the Researcher at [redacted] or [redacted]. You can also call the IRB of record of this study, Western IRB at 360-252-2500.

Appendix G

Gantt Chart

Key Steps	**January 1st 2018- September 16th, 2018**	**September '18**	**October '18**	**November '18**	**September 17th – December 1st, 2018**
Module live in MyPath		17th		1st	
Introductory and Reminder emails for recruitment		17th	23rd		
Data collection: pre- and post-test					
Data collection: pre-intervention Narcan prescriptions					
Data collection: post-intervention Narcan prescriptions					

Appendix H

Histograms