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Analysis of long-term opioid prescribing practices in cancer patients at a pediatric tertiary institution

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ANALYSIS OF LONG-TERM OPIOID PRESCRIBING PRACTICES IN CANCER PATIENTS AT A PEDIATRIC TERTIARY INSTITUTION

by

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ANALYSIS OF LONG-TERM OPIOID PRESCRIBING PRACTICES IN CANCER PATIENTS AT A PEDIATRIC TERTIARY INSTITUTION

JENNY JAN

ABSTRACT

Introduction: Pain is common in cancer. Pain can present at the time of diagnosis or it can develop during treatment. Cancer-related chronic pain is often treated with long-term (3 or more consecutive refills) opioid prescriptions. Opioids are a controlled substance and are thus regulated at the federal, state, and local levels.

Objectives: The first goal of this study is to examine Boston Children's Hospital's general compliance with federal, state, and local opioid prescribing policies. The second goal of this study is to distinguish cancer patients requiring long-term opioids from non-cancer patients requiring long-term opioids.

Methods: This study was a retrospective chart review using summative qualitative content analysis. This is the process where content is grouped into themes and then is further quantified within each theme.

Results: Documents required to ensure compliance with opioid prescribing regulations at the local level are not always well documented. These include the Long-Term Opioid Agreement and the risk evaluation of opioid misuse and abuse using one of several tools annually. At Boston Children's Hospital (BCH), the CRAFFT (car, relax, alone, forget, friends, trouble) questionnaires are used for this purpose. State policies require that, if a patient is not seen at least once every 6 months, physicians must document explicitly why a clinic visit was not

possible. These reasons are never clearly listed within the medical record. Additionally, data shows that cancer patients using long-term opioids tend to be younger (mean age 14.4) than non-cancer patients (mean age 26.7). Cancer pain can present either at diagnosis, during treatment, or be present during both. Where n=16 cancer patients, 62.53% experienced pain both at diagnosis and during treatment, 25% experienced pain only during treatment, and 12.5% experience pain only at diagnosis. Finally, data also show that anxiety and comorbidity are common, 34.6% of n=29 patients in both cancer and non-cancer patients using long-term opioids. 34.6% of patients experienced comorbidities of either anxiety or depression.

Conclusions: Despite these discrepancies with documentation, review of patients on long-term opioids revealed those with complex and painful medical conditions generally had valid reasons to require long-term opioids. Therefore, there is no evidence that BCH prescribers are involved in any sort of inappropriate opioid prescribing. Finally, no meaningful conclusions were drawn from data regarding pain score and weight because of inconsistencies in electronic medical record documentation in these areas.

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LIST OF ABBREVIATIONS

BCH ..... Boston Children's Hospital

CAPE ..... Critical Care Anesthesia Perioperative Extension

CDC ..... Center for Disease Control and Prevention

CRAFFT ..... Car, Relax, Alone, Friends, Forget, Trouble

CSA ..... Controlled Substances Act

DFCI ..... Dana Farber Cancer Institute

ERM ..... Electronic Medical Record

FDA ..... Food and Drug Administration

IASP ..... International Association for the Study of Pain

PACT ..... Pediatric Advanced Care Team

WHO ..... World Health Organization

INTRODUCTION

Opioids are prescription medications that are used to treat pain. They act on opioid receptors in the brain, spinal cord, and organs, thereby decreasing the body's perception of pain. For this reason, they are commonly used as analgesics and have long been used in the treatment of acute and terminal pain.

About 10 million people worldwide are diagnosed with cancer each year (IASP, 2015). Pain is common amongst these patients and is either present at the time of diagnosis or develops throughout the course of the disease. Approximately 25% to 30% of patients with cancer report pain at the time of diagnosis (Pharo and Zhou, 2005), and about 70% to 80% develop pain over the course of their disease (Mercadante and Fulfaro, 2005). Cancer pain has many etiologies. Tumor infiltration, for example, can cause cancer-related pain. Additionally, cancer treatments themselves can cause pain. Patients may experience post-surgery pain, chemotherapy-induced neuropathic pain, anti-estrogen therapy-related musculoskeletal pain, or radiotherapy-induced pain. Unrelieved cancer pain can have devastating effects on a patient, such as functional impairment, immobility, social isolation, emotional and spiritual distress, psychological stress, and ultimately, a reduced quality of life (Pergolizzi *et al*. 2014 and IASP, 2015).

While the practice of long-term opioid use in the treatment of chronic non-cancer pain is still under study, its use in chronic cancer pain is widely accepted. Opioids are both inexpensive and highly effective in treating cancer-related pain (WHO, 2015). The World Health Organization (WHO) has developed some useful guidelines in prescribing opioids for cancer pain. When these WHO guidelines are followed, they have been shown to provide effective pain control in 90% of patients (Pharo and Zhou, 2005). The WHO has developed a 3-step model for adults, where a patient with persisting or increasing pain is first given non-opioid medications. If pain still remains, then the patient is given an opioid prescription for mild/moderate pain. If this still does not provide enough pain relief, then the patient is given an opioid prescription for moderate/severe pain (WHO, 2015). For pediatric cancer patients, on the other hand, the WHO has adapted a 2-step model for opioid prescribing. Pediatric patients with mild/moderate pain should be given ibuprofen or paracetamol. Pediatric patients with moderate/severe pain should be given strong opioids, with morphine being the drug of choice (WHO, 2012).

Common childhood cancers include leukemia, lymphoma, bone sarcomas, brain tumors, and neuroblastomas. These can cause diffuse bone and joint pain or headaches throughout the course of the disease. During the course of their treatment, pediatric cancer patients can also

suffer from neuropathic pain, which results from injury to the nervous system, as a result of damage caused by treatment (chemotherapy, radiation, etc.), or a tumor disrupting nerves or the spinal cord. Additionally, pain can result from treatment complications such as mucositis or infection. Treatment related cancer pain is common and is commonly managed with opioids.

Oral codeine, morphine, oxycodone, hydromorphone, fentanyl, and methadone are the opioid analgesics commonly prescribed for pain management. Of these, morphine is one of the most commonly prescribed and is used for moderate to severe cancer pain (IASP, 2009). Morphine is generally the fist opioid agent physicians will prescribe to patients with cancer pain. If dose-limiting side effects arise, then hydromorphone or fentanyl can be used (IASP, 2014). Finally, Methadone has a long half-life and is considered a long-acting drug. It is often prescribed when patients build tolerance to their shorter-acting opioid analgesics.

In general, opioid prescribing in the United States has increased steadily in the past decade (Benyamin, 2008). In 2012, 259 million prescriptions were written for painkillers. This is enough for every American adult to have a prescription for opioids (CDC, 2014). As prescription rates have risen, deaths from prescription drug overdose have also followed suit and are now the leading cause of unintentional death (CDC, 2014). Opioid prescriptions are commonly written upon hospital

discharge and there is evidence that some of these legally administered drugs are being diverted for non-medical use (Manchikanti and Singh, 2008). It is unlikely, though, that hospital prescribers are writing enough prescriptions to supply the entire national opioid problem, even though some hospital prescribing rates can run as high as 72% among patients being admitted for nonsurgical reasons (Herzig, 2014). Studies have shown that hospitals with higher opioid prescription rates have a high risk of a severe opioid-related adverse event occurring per patient (Herzig, 2014).

In the United States, approximately 90% of chronic pain patients are receiving opioids (Benyamin, 2008). Patients receiving pain treatment with long-term opioids are at a high risk for diagnoses of drug abuse, drug dependence, and drug addiction (Fishbain, 1992). Of this subset of patients, a small percentage is at risk for abuse or addiction, while a larger percentage is at risk for displaying aberrant drug-related behaviors and illicit drug use (Fishbain, 2008). Additionally, higher dosages of opioid medications indicate greater risks for opioid misuse (Bohnert *et al*., 2011) and overdose (Dunn, 2010).

Patients with a history of drug or alcohol abuse (especially with previous drug or driving while under the influence convictions) are more likely to commit opioid misuse (Ives, 2006). For this reason, patients with a history of substance abuse should be closely monitored and followed for

signs of misuse, abuse, or diversion if opioids are prescribed (Ives, 2006). For example, Boston Children's Hospital has developed a validated questionnaire that evaluates a patient's history of drug or alcohol abuse. This questionnaire – the CRAFFT screening questions (Figure 2 and 3) – is designed to help physicians identify patients with higher risks of opioid misuse, abuse, or diversion. The CRAFFT questionnaire is so named because of its assessment six areas of behavior and how they are influenced by a patient's drug use: car, relaxation, being alone, forgetfulness, friends, and getting into trouble.

In addition to risk of abuse or addiction, there are also many side effects associated with opioid use. The two most common side effects are constipation and nausea, which can last throughout the entire duration of opioid use (Benyamin, 2008). Other major side effects include sedation, dizziness, vomiting, constipation, and respiratory depression (Benyamin, 2008). Some of the less common side effects also include delayed gastric emptying, hyperalgesia (at high doses), immunologic dysfunction, hormonal dysfunction, muscle rigidity, and myoclonus (Benyamin 2008). The side effects and risk of abuse/addiction associated with opioids keep long-term use a relevant matter of debate.

Doctors who prescribe opioids have a responsibility to follow up with their patients. They have an obligation to monitor patients to ensure that the benefits of opioid use in the treatment of long-term pain outweigh

the costs. Physicians use a variety of methods when overseeing their patients on long-term opioid therapy. One technique simply does not provide enough information. Urine toxicology testing and behavioral assessment together are better able to identify patients with inappropriate drug-taking behavior than either method alone (Katz, 2003). In addition to urine drug screening, most long-term opioid guidelines throughout the nation also agree that specific attentions should be paid to upper dosing thresholds, drug-drug and drug-disease interactions, and use of risk assessment tools and treatment agreements when monitoring patients on long-term opioids (Nuckols, 2014). Examining patients regularly and asking them questions about their level of pain, opioid use and function provide a lot of information. Getting the perspective of parents and caregivers on function is very important.

Opioids are a controlled substance regulated by federal, state, and local laws. The Controlled Substances Act (CSA) is the overarching law that regulates opioids (and other controlled substances) at the federal level. The CSA mandates that opioids can only be dispensed with a written prescription from a practitioner (FDA, 2011). There are also separate laws that govern opioid prescribing practices at the state level. The state of Massachusetts, for example, requires that all opioid prescriptions be manually signed and that separate prescriptions are written for each controlled substance (Patrick, 2010). Additionally, opioid

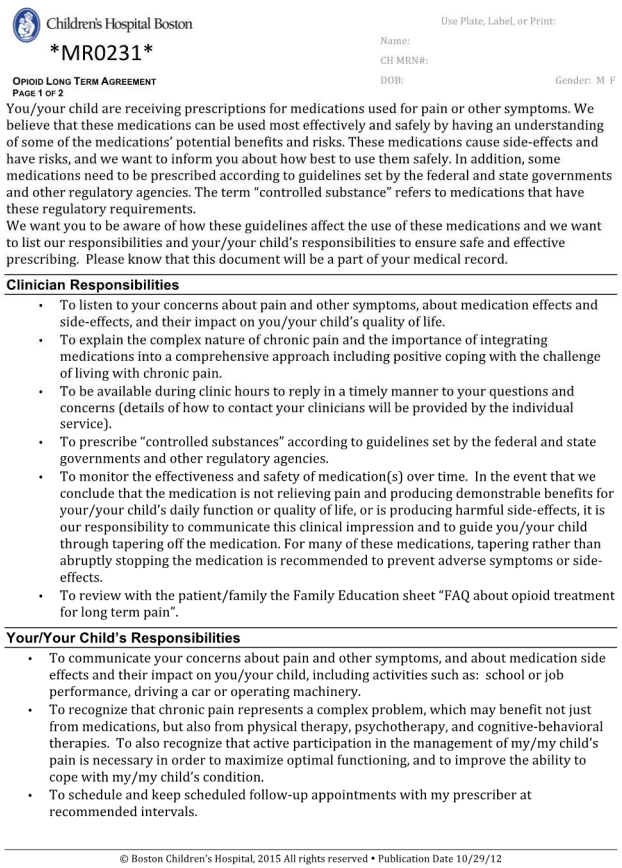
prescriptions are only valid for 30 days after their issue date, and cannot be filled for more than a 30-day supply at a time (Patrick, 2010). Finally, Massachusetts's law states that when prescribing opioids over a long period of time, physicians must see the patient at least once every six months, or otherwise write a note in the medical records explaining why this might be impractical (Patrick, 2010).

Opioid prescribing is also locally regulated. Tertiary institutions have their own policies that differ slightly from one another. Boston Children's Hospital in Massachusetts, for example, requires long-term opioids be prescribed electronically for ease of tracking. Additionally, patients or parents/caregivers and the prescriber are required to sign the Boston Children's Hospital Controlled Substance Agreement (Figure 1) annually. Physicians are also required to assess a patient's level of risk annually using the CRAFFT questionnaire (Figure 2 and 3) (BCH, 2012a). The assessed level of risk is used to determine frequency of clinical evaluations and urine screenings. Patients who are determined to be low risk are required to have an in person evaluation with the prescribing physician at least every four months (BCH, 2012a). Patients who are determined to be of moderate risk are required to have an in person evaluation with the prescribing physician at least every one month (BCH, 2012a). Subsequently, patients with high risk are required to have more frequent urine toxicology screens.

Literature in pediatric long-term opioid use is scarce. Most of the strategies used in dealing with children on long-term opioids are derived from information provided in adult literature. There are no randomized controlled trials that deal with breakthrough pediatric cancer pain. (Friedrichsdorf, 2014). The limited data available in this area of research indicates that pediatric cancer pain is “common, under assessed, and undertreated” (Friedrichsdorf, 2014). Additionally, most hospitals do not have chronic pain teams that can adequately address non-palliative long-term opioid use.

Boston Children’s Hospital has a Pain Treatment Service that was founded in 1986. The Pain Treatment Service draws together multiple disciplines in order to provide “treatment and support for acute and chronic pain in children and young adults” (BCH, 2005). Boston Children’s Hospital’s Pain Treatment Service is part of the Department of Anesthesiology, Perioperative, and Pain Medicine and, at the time, was the first program of its kind (BCH, 2005). The Pain Treatment Service provides both inpatient consultations as well as an outpatient clinic. In terms of opioid prescribing, the inpatient branch of the Pain Treatment Service monitors perioperative, acute pain opioid dosing, and other general inpatient pain medication needs. The outpatient branch of the Pain Treatment Service, on the other hand, is involved in the overall pain management of patients with chronic pain.

The objective of this study is two-fold. The first goal is to examine Boston Children's Hospital's compliance with federal, state, and local opioid prescribing regulations. The second is to better characterize cancer patients who are using long-term (3 or more consecutive refills) opioids.



Children's Hospital Boston

MR0231

Use Plate, Label, or Print:

Name:

CH MRN#:

DOB: Gender: M F

OPIOID LONG TERM AGREEMENT
PAGE 1 OF 2

You/your child are receiving prescriptions for medications used for pain or other symptoms. We believe that these medications can be used most effectively and safely by having an understanding of some of the medications' potential benefits and risks. These medications cause side-effects and have risks, and we want to inform you about how best to use them safely. In addition, some medications need to be prescribed according to guidelines set by the federal and state governments and other regulatory agencies. The term "controlled substance" refers to medications that have these regulatory requirements.

We want you to be aware of how these guidelines affect the use of these medications and we want to list our responsibilities and your/your child's responsibilities to ensure safe and effective prescribing. Please know that this document will be a part of your medical record.

Clinician Responsibilities

- To listen to your concerns about pain and other symptoms, about medication effects and side-effects, and their impact on you/your child's quality of life.
- To explain the complex nature of chronic pain and the importance of integrating medications into a comprehensive approach including positive coping with the challenge of living with chronic pain.
- To be available during clinic hours to reply in a timely manner to your questions and concerns (details of how to contact your clinicians will be provided by the individual service).
- To prescribe "controlled substances" according to guidelines set by the federal and state governments and other regulatory agencies.
- To monitor the effectiveness and safety of medication(s) over time. In the event that we conclude that the medication is not relieving pain and producing demonstrable benefits for your/your child's daily function or quality of life, or is producing harmful side-effects, it is our responsibility to communicate this clinical impression and to guide you/your child through tapering off the medication. For many of these medications, tapering rather than abruptly stopping the medication is recommended to prevent adverse symptoms or side-effects.
- To review with the patient/family the Family Education sheet "FAQ about opioid treatment for long term pain".

Your/Your Child's Responsibilities

- To communicate your concerns about pain and other symptoms, and about medication side effects and their impact on you/your child, including activities such as: school or job performance, driving a car or operating machinery.
- To recognize that chronic pain represents a complex problem, which may benefit not just from medications, but also from physical therapy, psychotherapy, and cognitive-behavioral therapies. To also recognize that active participation in the management of my/my child's pain is necessary in order to maximize optimal functioning, and to improve the ability to cope with my/my child's condition.
- To schedule and keep scheduled follow-up appointments with my prescriber at recommended intervals.

OPIOID LONG TERM AGREEMENT
PAGE 2 OF 2

Name:

CH MRN#:

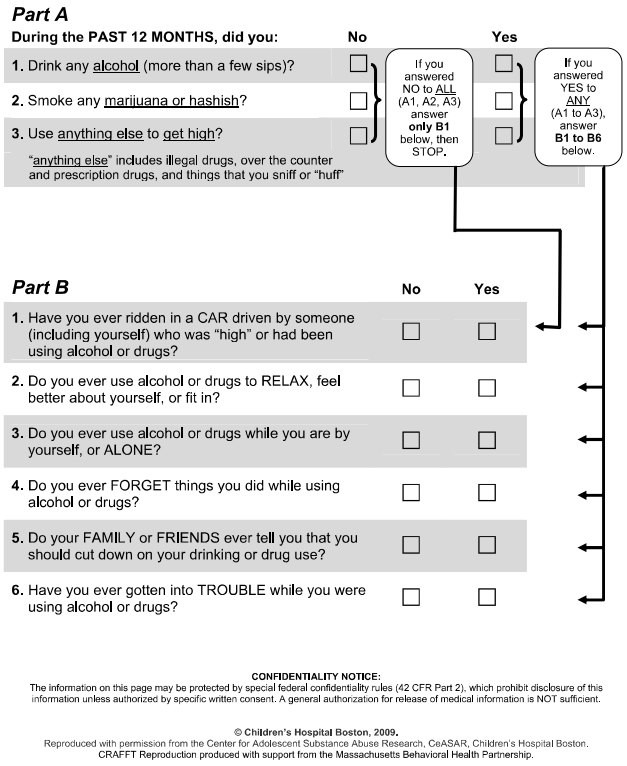
- To agree to the following:
  - ❖ To use "controlled substances" only as directed by the prescriber.
  - ❖ To obtain prescriptions for controlled substances only from the prescriber named below.
  - ❖ To use one pharmacy for filling prescriptions, except in the case of an emergency.
  - ❖ To accept generic brands when determined appropriate by the prescriber.
  - ❖ To work with the prescriber to ensure safe and appropriate medication use. In some situations, urine or blood tests may be required.
  - ❖ To keep track of the medication so that I/my child will not run out:
    - Count the pills received from the pharmacy and ensure that the correct amount is received. Discuss any shortage with the pharmacist upon receiving the prescription.
    - Medication refills will not be made at night, on holidays, or on weekends. Most controlled substances cannot be telephoned into a pharmacy. Please make arrangements to pick up your prescription during regular business hours, or allow time for the U.S. Postal Service to get the prescription to your home.
    - Do not expect a prescription for medications that have been lost or stolen, or to receive additional medication prior to the expected time of the next scheduled refill. Federal and state regulations mandate filing a police report in the event of stolen medication.
  - ❖ To agree that, if it appears to the prescriber that there are no demonstrable benefits to my daily function or quality of life from the medication, then the medication will be gradually tapered and discontinued, as directed by the prescribing physician. Tapering, rather than abruptly stopping, these types of medications, is necessary to prevent unpleasant symptoms and side-effects.

We look forward to caring for you/your child. We hope that this agreement facilitates communication.

Signatures

Patient/Parent/Guardian Signature		Print Name	Date
Relationship to Patient			
Clinician/Title Signature		Print Name	TIME Date

Figure 1. **BCH Long-Term Opioid Agreement.** This document outlines the responsibilities of both the prescribing clinician and the patient's (or guardian's) responsibilities involved in receiving opioid prescriptions. For patients on long-term opioids, this document should be signed yearly in order to guarantee safe and effective use of these medications. (BCH, 2012b).



The CRAFFT Screening Questions

Please answer all questions honestly; your answers will be kept confidential.

Part A

During the PAST 12 MONTHS, did you:	No	Yes
1. Drink any alcohol (more than a few sips)?	☐	☐
2. Smoke any marijuana or hashish?	☐	☐
3. Use anything else to get high?	☐	☐

"anything else" includes illegal drugs, over the counter and prescription drugs, and things that you sniff or "huff"

If you answered NO to ALL (A1, A2, A3) answer **only B1** below, then STOP.

If you answered YES to ANY (A1 to A3), answer **B1 to B6** below.

Part B

	No	Yes
1. Have you ever ridden in a CAR driven by someone (including yourself) who was "high" or had been using alcohol or drugs?	☐	☐
2. Do you ever use alcohol or drugs to RELAX, feel better about yourself, or fit in?	☐	☐
3. Do you ever use alcohol or drugs while you are by yourself, or ALONE?	☐	☐
4. Do you ever FORGET things you did while using alcohol or drugs?	☐	☐
5. Do your FAMILY or FRIENDS ever tell you that you should cut down on your drinking or drug use?	☐	☐
6. Have you ever gotten into TROUBLE while you were using alcohol or drugs?	☐	☐

Figure 2. **BCH CRAFFT screening tool self assessment.** This document is designed as a questionnaire survey for patients to fill out annually. Part A of the document is designed to assess the patient's history of substance abuse, and Part B, should the patient present with any illegal drug use, is designed to assess patient behavior associated with drug use (BCH, 200b).

The CRAFFT Screening Interview

Begin: "I'm going to ask you a few questions that I ask all my patients. Please be honest. I will keep your answers confidential."

Part A

During the PAST 12 MONTHS, did you:	No	Yes
1. Drink any alcohol (more than a few sips)? (Do not count sips of alcohol taken during family or religious events.)	☐	☐
2. Smoke any marijuana or hashish?	☐	☐
3. Use anything else to get high? ("anything else" includes illegal drugs, over the counter and prescription drugs, and things that you sniff or "huff")	☐	☐

For clinic use only: Did the patient answer "yes" to any questions in Part A?

No ☐ → **Ask CAR question only, then stop**

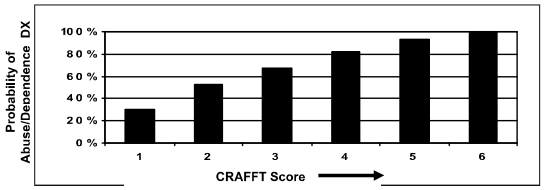
Yes ☐ → **Ask all 6 CRAFFT questions**

Part B	No	Yes
1. Have you ever ridden in a **CAR** driven by someone (including yourself) who was "high" or had been using alcohol or drugs?	☐	☐
2. Do you ever use alcohol or drugs to **RELAX**, feel better about yourself, or fit in?	☐	☐
3. Do you ever use alcohol or drugs while you are by yourself, or **ALONE**?	☐	☐
4. Do you ever **FORGET** things you did while using alcohol or drugs?	☐	☐
5. Do your **FAMILY** or **FRIENDS** ever tell you that you should cut down on your drinking or drug use?	☐	☐
6. Have you ever gotten into **TROUBLE** while you were using alcohol or drugs?	☐	☐

SCORING INSTRUCTIONS: FOR CLINIC STAFF USE ONLY

CRAFFT Scoring: Each "yes" response in **Part B** scores 1 point.
A total score of 2 or higher is a positive screen, indicating a need for additional assessment.

Probability of Substance Abuse/Dependence Diagnosis Based on CRAFFT Score[1,2]



DSM-IV Diagnostic Criteria[3] (Abbreviated)

Substance Abuse (1 or more of the following):
- Use causes failure to fulfill obligations at work, school, or home
- Recurrent use in hazardous situations (e.g. driving)
- Recurrent legal problems
- Continued use despite recurrent problems

Substance Dependence (3 or more of the following):
- Tolerance
- Withdrawal
- Substance taken in larger amount or over longer period of time than planned
- Unsuccessful efforts to cut down or quit
- Great deal of time spent to obtain substance or recover from effect
- Important activities given up because of substance
- Continued use despite harmful consequences

References:
1. Knight JR, Shrier LA, Bravender TD, Farrell M, Vander Bilt J, Shaffer HJ. A new brief screen for adolescent substance abuse. Arch Pediatr Adolesc Med 1999;153(6):591-6.
2. Knight JR, Sherritt L, Shrier LA, Harris SK, Chang G. Validity of the CRAFFT substance abuse screening test among adolescent clinic patients. Arch Pediatr Adolesc Med 2002;156(6):607-14.
3. American Psychiatric Association. Diagostic and Statistical Manual of Mental Disorders, fourth edition, text revision. Washington DC, American Psychiatric Association, 2000.

Figure 3. **BCH CRAFFT screening interview.** These documents are designed for clinic personnel conducting a patient interview and should be updated annually. Part A of the CRAFFT interview asks about patient history of substance abuse. If a patient does report a history illegal drug use, then Part B questions are used to clarify the patient's behaviors during and around drug use. The second page is a set of instructions for the clinic personnel conducting the patient interview (BCH, 2009a).

METHODS

Algorithms were used to analyze retrospective prescription data and identify patients using long-term (at least 3 consecutive refills) opioids during the 2014 calendar year. These algorithms were also used to collect basic patient demographics, the number of prescriptions written during the specified time frame, and the original order date and time, the order mnemonic, and the prescriber.

Once patients on long-term opioids were identified, a retrospective chart review (using Boston Children's Hospital's electronic medical record system in Powerchart) was conducted to collect relevant data. Data collection included patient demographics, clinical characteristics, co-morbidities, clinical course, prescribing practices, and compliance with controlled substance agreements. "Demographics" includes information such as age, gender, race, ethnicity, language, and weight. "Clinical characteristics" includes information such as the type of pain, the average pain score, the lowest documented pain score, and the highest documented pain score. "Clinical course" includes information such as important visit dates (to the pain service, oncology clinic, etc.), any complications during a visit, length of time the patient has been on long-term opioids, and whether or not prescription order dates correspond with a visit with the prescriber. "Prescriptions" includes the patient's current prescriptions, length of time on a specific drug, and number of prescribers

for each drug in the same time frame. Finally, “Compliance with controlled substance agreements” includes the patient’s documented level of risk, any safeguards established to address risk, date of signed Boston Children’s Hospital controlled substance agreements, and dates of urine tests. Visual representation of each of the above described categories is presented below in Table 1. Finally, co-morbidities were also listed for each patient. This was essentially a list of the various diagnoses a patient had.

Demographics
Age
Gender
Race
Ethnicity
Weight
Language

Clinical Characteristics
Type of Pain
Level of Acuity
Lowest Pain Score
Highest Pain Score
Non-Cancer, Pain at Diagnosis, Pain During Treatment, or Both ?

Clinical Course
Relevant Visit Dates
Complications
Length of Time on Long-Term Opioids
Prescription Date
Corresponding Visit? Yes/No

Table 1: **Data collection categories.** These are the categories and subcategories for which data was collected during this chart review.

Prescriptions
Drug
Method of Delivery
Number of Prescribers
Concentration
Current Dose
Date Started

Compliance with Controlled Substance Regulations
Level of Risk
Safeguards Addressing Risk
Date of First Long-Term Opioid Agreement
Date of Most Recent Long-Term Opioid Agreement
Signed Yearly? Yes/No
Kept Follow-Up Visits? Yes/No
Date of Urine Screening

Table 1 continued. **Data collection categories.**

The information obtained from this small subset of patients on long-term opioids was used in a summative qualitative content analysis (Solodiuk, 2014). This process includes grouping content into themes then further quantifying the numbers within each theme. The data analysis was a non-directed process and themes were identified only during the review of the data.

Additionally, several guidelines were established to help direct data collection. For example, the decision was made to look through a patient's entire history with the Pain Treatment Service, instead of just clinic notes

from the 2014 calendar year. This was also the case for any other relevant clinics involved in monitoring the patient's pain management.

When examining compliance with opioid prescribing regulations, follow up visits or communications with the prescribing physician had to be within 2 weeks of the date the prescription order was sent in to the pharmacy. If visits or communications occurred outside of this two-week time frame, then the prescription date was considered to have no associated clinic visit or communication. In addition, the mathematical average between all documented pain scores was used when documenting the level of acuity of the patient's pain. Pain scores were collected from every clinical note under the Boston Children's Hospital Service responsible for a patient's pain management. Both the lowest and highest documented pain scores across all visits were collected as well. There were several incidences where, out of all of a patient's clinic visits, only one pain score was provided. If the patient self-reported this single pain score as the level of pain he/she feels "on average", then it was recorded as the average level of acuity. In any other cases where only one pain score was recorded, level of acuity (Table 1) was not calculated because it would not have been an accurate representation of the patient's average. Instead, the single pain score was recorded as either the lowest or highest pain score as reported by the patient.

Age is an important demographic characteristic in describing patients that are on long-term opioids. When collecting data, the patient's current age (at the time their chart was reviewed) was recorded. If a patient was deceased at the time of review, their age at death was recorded. Secondly, when documenting patient weight, patients heavier than 50 kg, or greater than 14 years old, had to have a recent weight documented within the last two years. Patients between 25 kg and 50 kg, had to have a documented weight within the last year. Finally, patients less than 25 kg, had to have a documented weight within the last six months. If these criteria were not met, then patient weight was considered "not documented".

Finally, cancer patients were specifically grouped into "at diagnosis", "during treatment", or "both". These categories refer to the timing of pain presentation. Patients who experienced pain at diagnosis, but were documented to have "good pain relief" from their opioid regimen, experienced no new pain, and consistently "denied pain" during clinic visits were assumed to have had no pain from their treatment. Thus, these patients were classified in the "at diagnosis" group. Additionally, patients who did develop treatment-related pain, but did not experience pain at, or prior to, diagnosis were classified in the "during treatment category". Finally, patients that had pain both at diagnosis and pain due to treatment were classified in the "both" category.

RESULTS

Retrospective chart review of patients on long-term opioids has provided insight into the opioid prescribing practices at Boston Children's Hospital. More specifically, the study has also allowed us to examine the institution's compliance with federal, state, and local opioid prescribing regulations, as well as to identify specific characteristics of cancer patients in need of long-term opioids.

The Commonwealth of Massachusetts requires that patients taking opioids must be seen by their physician every 6 months or have explicit explanation why this is not possible. For patients on long-term opioids not seen at least every six months, there was never an explicit statement of why these visits did not occur. Upon detailed examination of the medical record though, one is able to infer why these visits were not possible. For example, the patient had advanced muscular dystrophy and traveling to and from Boston Children's Hospital would be extremely difficult.

Local opioid prescribing regulations specific to Boston Children's Hospital state that patients must complete the CRAFFT questionnaire (Figure 2 and 3) to help determine level of risk. The level of risk established by the CRAFFT questionnaire determines the frequency of clinic visits and urine screenings a patient needs. Chart review of patients on long-term opioids shows no CRAFFT questionnaire on file for any patient. Furthermore, level of risk was never formally documented in the

medical records and there was no record of urine toxicology screens for opioids for any of the patients.

Additionally, Boston Children's Hospital policies state that patients must sign the "Opioid Long-Term Agreement" (Figure 1) annually. Extensive chart review showed that most patients do not have any such signed agreement in their electronic medical records (ERM). For patients that did have at least one signed Opioid Long-Term Agreement on file, very rarely was the agreement updated annually, and documentation was sporadic at best. Out of a total of 29 patients reviewed, and four patients that had at least one signed Boston Children's Hospital Opioid Long-Term Agreement, only one was a cancer patient being followed through the Dana Farber Cancer Institute (DFCI) Oncology Clinic. The remaining three had non-cancer diagnoses, one of whom demonstrated full compliance with local policy on signing the BCH Opioid Long-Term Agreements annually. Thus, out of a total of 29 patients reviewed, only one patient demonstrated compliance in regards to the Opioid Long-Term Agreement.

Physicians working in the Pain Service were not the only opioid prescribers. Often times, other clinics and services within Boston Children's Hospital were responsible for prescribing and following up with patients on long-term opioids. For cancer patients, the Dana Farber Cancer Institute Oncology Clinic prescribed and followed up with patients. For patients with very complex healthcare needs, or requiring home

ventilation, the CAPE (Critical Care Anesthesia Perioperative Extension and Home Ventilation) program was often the source of opioid prescription and follow-up. Finally, for patients involved in palliative care program, the PACT (Pediatric Advanced Care Team) service was often responsible for opioid prescribing and patient follow-up.

A total of 29 patients were identified for long-term opioid use (>3 consecutive refills) in 2014. 55% of these patients had a primary diagnosis of cancer, and 45% had diagnoses other than cancer. Cancer diagnoses were limited to leukemia, Ewing's sarcoma, neuroblastoma, retinoblastoma, and osteosarcoma. These are all consistent with the accepted common childhood cancers. All cancer patients identified within this study received opioid prescriptions, and subsequent follow-up through the DFCI Oncology Clinic.

A. Ages of Patients

In general, cancer patients tend to be younger chronic opioid users than non-cancer patients (Table 2). The mean age of a cancer patient taking long-term opioids is 14.4 years, whereas the mean age of non-cancer patients requiring long-term opioids is 26.7 years. Additionally, within the cohort of patients using long-term opioids, the youngest cancer patient is 3 years old and the oldest is 25 years old. Non-cancer patients, on the other hand, occupy a larger age range, with the youngest being 5

years old, and the oldest being 65 years old at the time this chart review was conducted.

Ages of Cancer Patients (years)	Ages of Non-cancer Patients (years)
3	5
4	6
7	10
7	17
10	23
13	28
13	30
13	31
14	31
17	31
17	32
20	38
21	65
22	
24	
25	
Mean=14.4	Mean=26.7

Table 2. **Ages of cancer *vs* non-cancer patients.** The ages documented are the patients' ages at the time their charts were reviewed. If a patient was deceased at the time of chart review, then their age at death was documented.

B. Weights of Patients

Cancer patients on long-term opioids weigh more, on average, than non-cancer patients on long-term opioids (Table 3). The mean weight of cancer patients is 54.6 kg, and the mean weight of non-cancer patients is 39.7 kg. This is the opposite of what is expected, given the mean ages of cancer and non-cancer patients. Cancer patients on long-term opioids are younger, on average, and therefore mean weight is expected to be less than that of non-cancer patients. This issue is discussed in greater detail in the "Discussion" section of this paper.

Of the patients included in this study (n=8), 27.6% did not have a recently documented weight within the ERM (Figure 4). Of these, only one was a cancer patient. This means that 87.5% of patients with undocumented weights were non-cancer patients, and only 12.5% were cancer patients. Additionally, of the 21 patients that did have recently documented weights (Figure 4), only 28.6% were non-cancer patients, as opposed to 71.4% that were cancer patients. In general, the DFCI oncology clinic was much better at consistently documenting patient weight in the ERM than other services were.

Weights of Cancer Patients (kg)	Weights of Non-Cancer Patients (kg)
13.3	14.9
14.8	31.8
20.5	34.9
21.6	52.5
30	45
33.2	59.2
43.4	
45.4	
67.5	
73.7	
77.9	
84	
87.8	
97.8	
108.4	
Mean=54.6	Mean=39.7

Table 3. **Documented weights of cancer *vs* non-cancer patients.** Patients heavier than 50 kg, or greater than 14 years old, had to have a weight recorded within the last two years. Patients between 25 and 50 kg, had to have a documented weight within the last year. Finally, patients less than 25 kg, had to have a documented within the last six months. If these criteria were not met, then a patient's weight was considered "not documented".

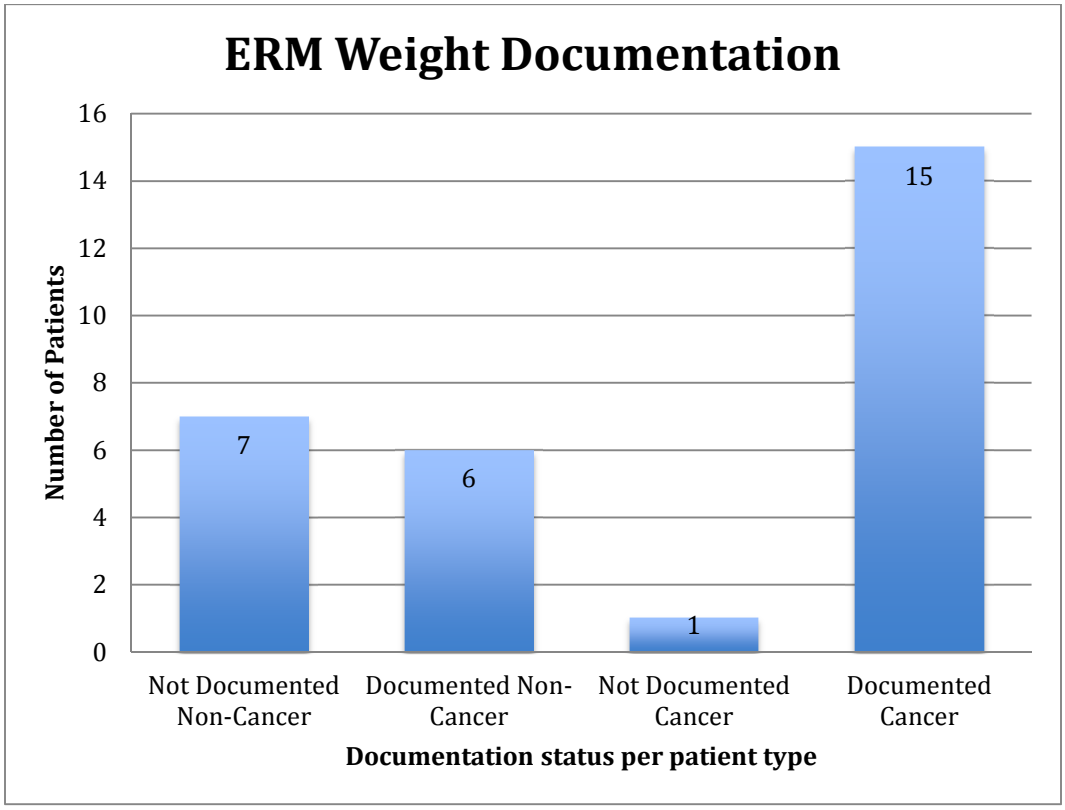


Figure 4. **ERM weight documentation status by patient type.** There were a total of eight patients with undocumented weights in their ERM. Seven of these patients were non-cancer patients, and only one was a cancer patient. There were only six non-cancer patients with documented weights, as opposed to 15 cancer patients with recently documented weight.

C. Timing of Pain Presentation

Cancer pain can be present at the time of diagnosis, develop during treatment, or both. Of the 16 cancer patients in this study, 62.53% experienced pain both at diagnosis and during their treatment, 25% experienced pain due to treatment only, and 12.5% experienced pain at diagnosis only (Figure 5).

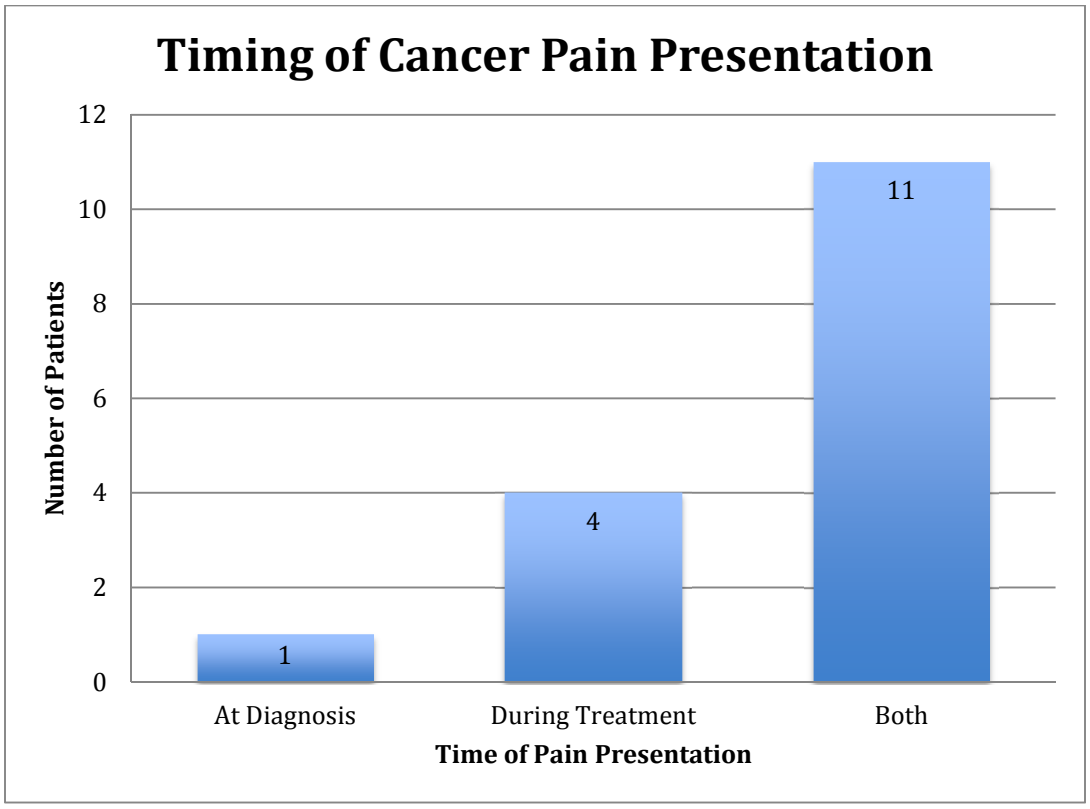


Figure 5. **Timing of cancer pain presentation.** Of the total of 16 cancer patients requiring long-term opioids for pain management, one had pain only at diagnosis, four had pain only during treatment, and 11 had pain both at diagnosis and due to treatment.

Patients experiencing pain during treatment mostly suffered from mucositis and neuropathy due to their chemotherapy and/or radiation course. There were also a few patients who suffered from steroid-related pain. There were also some instances where donor transplants and subsequent graft *versus* host disease caused significant, lasting pain in patients. In general, cancer patients can experience several different types of pain with different etiologies throughout the course of their disease. For example, there was a cancer patient who suffered from generalized muscle aches and pains due to steroid withdrawal as well as oral pain associated with mucositis.

D. Average Level of Acuity

Pain acuity is measured on a scale of 0 – 10, with 0 representing no pain, and 10 representing the worst pain a patient has ever felt. The mean level of pain acuity cancer patients experience is 5.2/10. The mean level of pain acuity of non-cancer patients is 5.5/10 (Table 4). Unfortunately, no meaningful conclusions were drawn from these values due to inconsistencies in ERM documentation. This is further discussed in the “Discussion” section of this paper.

Average Level of Acuity:	
Cancer Pain	Non-Cancer Pain
3	1.23
3.75	5.5
4.5	5.67
5.33	6.7
6	8.5
7	
Mean=5.2	Mean=5.5

Table 4. **Average level of acuity: Cancer vs Non-cancer pain.** Each number on this graph represents the average level of acuity calculated for a single patient. The "average level of acuity" for each patient represents the average pain score across all documented pain scores. These scores are on a 0-10 scale.

E. Presence of Anxiety and Depression

Anxiety and depression were very common co-morbidities with chronic pain. Of the 29 total patients in this study, 34.6% had issues with anxiety or depression (Figure 6). Of these patients, 40% had issues with both anxiety *and* depression. Additionally, of the 34.6% of patients with co-morbidities of anxiety *or* depression, 40% of had primary diagnoses other than cancer, and 60% had primary diagnoses of cancer (Figure 7).

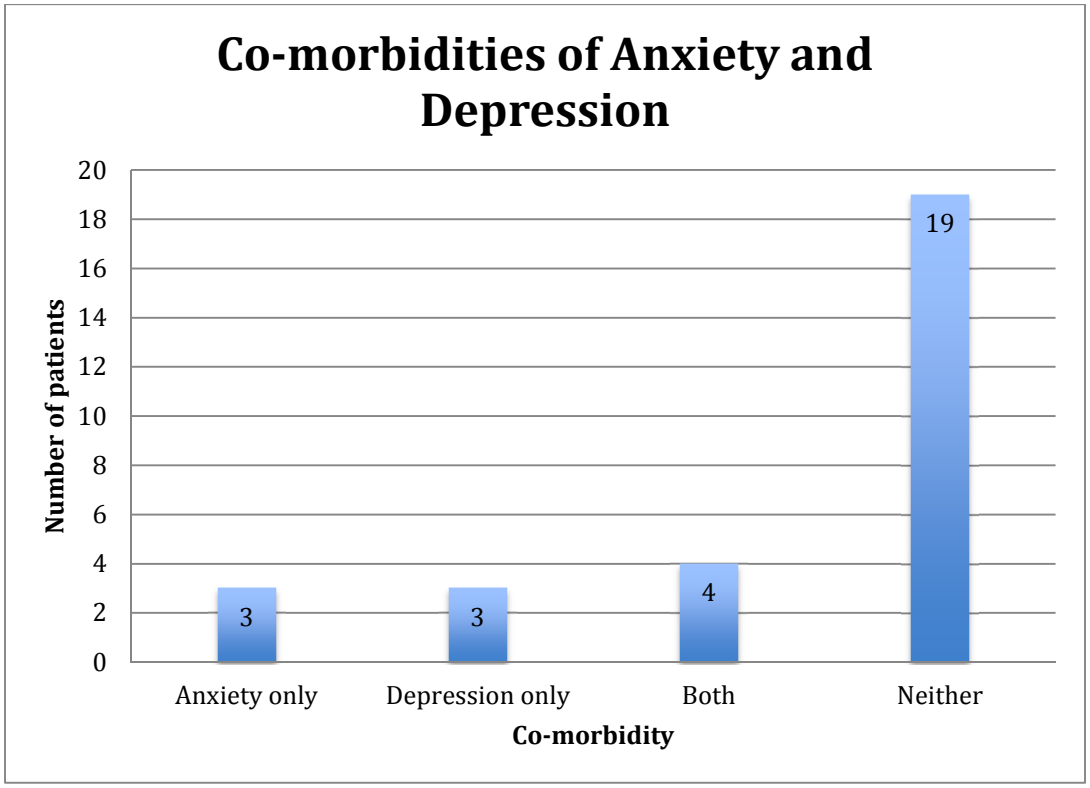


***Figure 6*. Number of patients with co-morbidities of anxiety, depression, both, or neither.** Of the 29 patients in this study, three patients experienced anxiety in addition to their primary diagnosis. Three patients experienced depression, four patients experienced both anxiety *and* depression, and 19 had no issues with neither anxiety *nor* depression.

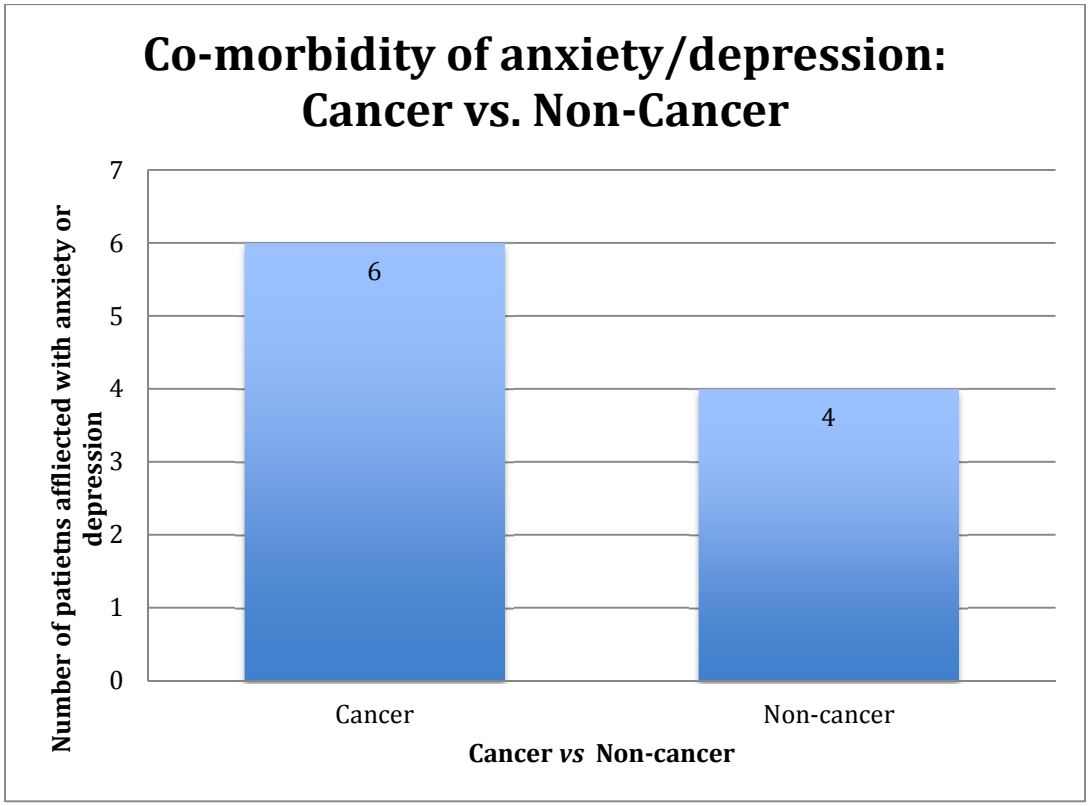


***Figure 7*. Co-morbidity of anxiety or depression: Cancer *vs* Non-cancer patients.** A total of 10 patients were identified to have co-morbidities of anxiety and/or depression. Of these patients, six patients had primary diagnoses of cancer, and four patients had primarily non-cancer diagnoses.

DISCUSSION

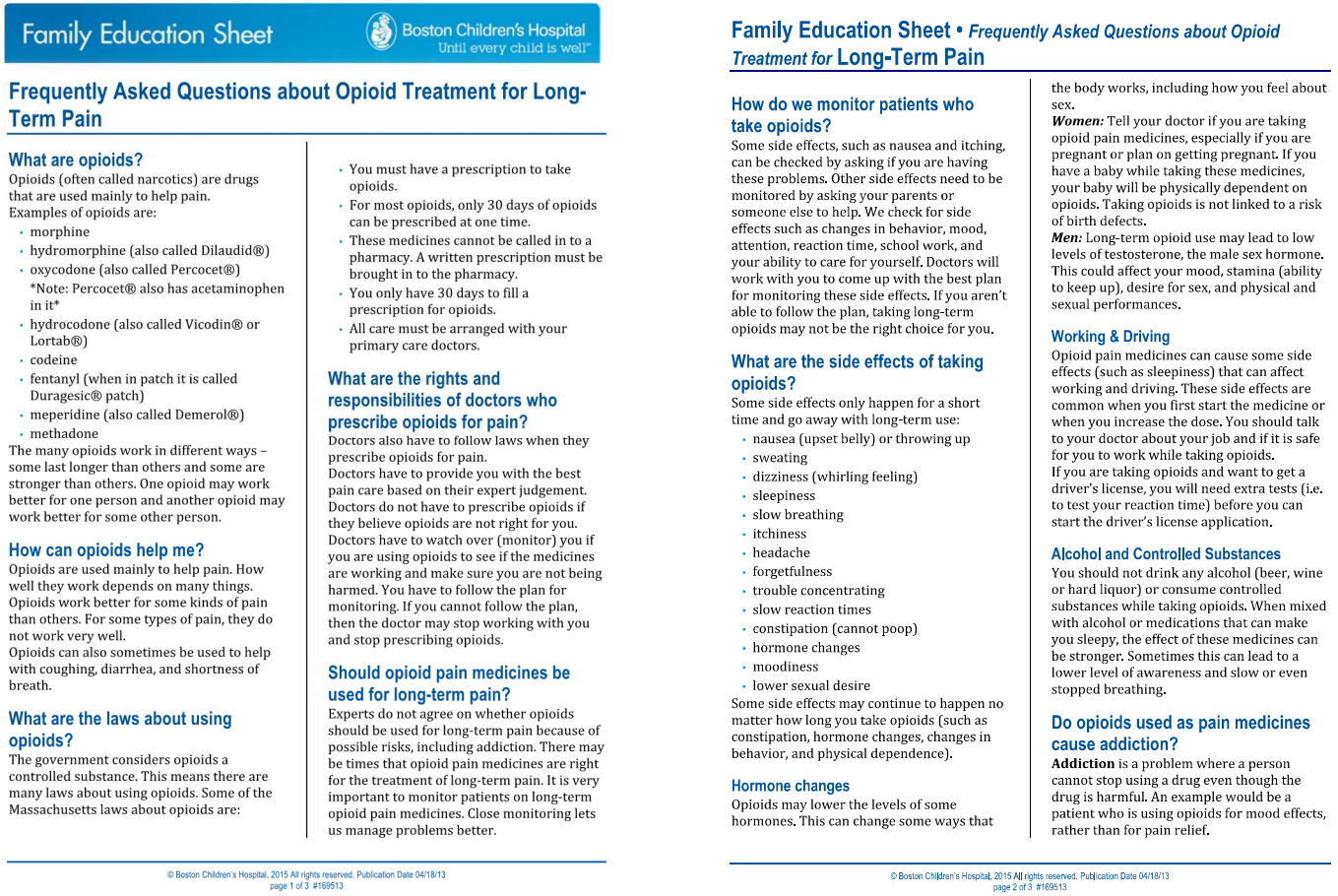
Detailed examination of patients using long-term opioids at Boston Children's Hospital shows opioids being prescribed appropriately to patients with valid reasons for long-term pain and the need for opioids. Diagnoses included to leukemia, Ewing's sarcoma, neuroblastoma, retinoblastoma, and osteosarcoma often with metastatic disease.

It is important to note that documentation did not often include the requirement of assessment of risk, pain intensity function or opioid agreement.

The CRAFFT questionnaire (Figures 2 and 3) and urine screening are both used to assess a patient's level of risk while on long-term opioids. Risk assessment is especially important in preventing diversion of opioids for non-medical use. Three different categories of risk – low risk, moderate risk, and high-risk child – are important in categorizing a patient's potential for opioid misuse, abuse, or diversion. A fourth category – high risk parent – is used in the case of a minor requiring long-term opioids, and assesses parent or guardian potential for misuse, abuse, or diversion of opioids prescribed to the patient. Without risk level assessment and urine screenings, evaluation of whether or not compliance visits were scheduled at appropriate intervals for each patient was not possible. Additionally, lack of documentation in these areas makes it difficult to identify patients (or guardians) at risk for opioid misuse, abuse, or diversion. More

specifically, occasional but consistent urine screenings would be helpful in identifying patients who are, or have, developed habits of misuse.

Boston Children's Hospital's Opioid Long-Term Agreement (Figure 1) is important because it outlines both the prescribing physician's and the patient's responsibilities throughout the duration of opioid use. The absence of a signed Opioid Long-Term Agreement within this chart review could imply that many of the patients are not fully aware of the responsibilities involved in carrying out a long-term opioid prescription. They may be unaware of the expectations their physicians have of them, as well as the legal aspects of their prescription. The Family Education Sheet of Frequently asked Questions about Opioid Treatment for Long-Term Pain (Figure 8) provides additional information about opioid use. This document is extremely informative, and should be something patients (and their parent/guardians) are given in tandem with the Opioid Long-Term Agreement. These two documents together provide patients with sufficient information about their opioid prescription.



Family Education Sheet

Boston Children's Hospital
Until every child is well™

Frequently Asked Questions about Opioid Treatment for Long-Term Pain

What are opioids?

Opioids (often called narcotics) are drugs that are used mainly to help pain.
Examples of opioids are:

- morphine
- hydromorphine (also called Dilaudid®)
- oxycodone (also called Percocet®)
  Note: Percocet® also has acetaminophen in it
- hydrocodone (also called Vicodin® or Lortab®)
- codeine
- fentanyl (when in patch it is called Duragesic® patch)
- meperidine (also called Demerol®)
- methadone

The many opioids work in different ways – some last longer than others and some are stronger than others. One opioid may work better for one person and another opioid may work better for some other person.

How can opioids help me?

Opioids are used mainly to help pain. How well they work depends on many things. Opioids work better for some kinds of pain than others. For some types of pain, they do not work very well.
Opioids can also sometimes be used to help with coughing, diarrhea, and shortness of breath.

What are the laws about using opioids?

The government considers opioids a controlled substance. This means there are many laws about using opioids. Some of the Massachusetts laws about opioids are:

- You must have a prescription to take opioids.
- For most opioids, only 30 days of opioids can be prescribed at one time.
- These medicines cannot be called in to a pharmacy. A written prescription must be brought in to the pharmacy.
- You only have 30 days to fill a prescription for opioids.
- All care must be arranged with your primary care doctors.

What are the rights and responsibilities of doctors who prescribe opioids for pain?

Doctors also have to follow laws when they prescribe opioids for pain.
Doctors have to provide you with the best pain care based on their expert judgement.
Doctors do not have to prescribe opioids if they believe opioids are not right for you.
Doctors have to watch over (monitor) you if you are using opioids to see if the medicines are working and make sure you are not being harmed. You have to follow the plan for monitoring. If you cannot follow the plan, then the doctor may stop working with you and stop prescribing opioids.

Should opioid pain medicines be used for long-term pain?

Experts do not agree on whether opioids should be used for long-term pain because of possible risks, including addiction. There may be times that opioid pain medicines are right for the treatment of long-term pain. It is very important to monitor patients on long-term opioid pain medicines. Close monitoring lets us manage problems better.

How do we monitor patients who take opioids?

Some side effects, such as nausea and itching, can be checked by asking if you are having these problems. Other side effects need to be monitored by asking your parents or someone else to help. We check for side effects such as changes in behavior, mood, attention, reaction time, school work, and your ability to care for yourself. Doctors will work with you to come up with the best plan for monitoring these side effects. If you aren't able to follow the plan, taking long-term opioids may not be the right choice for you.

What are the side effects of taking opioids?

Some side effects only happen for a short time and go away with long-term use:

- nausea (upset belly) or throwing up
- sweating
- dizziness (whirling feeling)
- sleepiness
- slow breathing
- itchiness
- headache
- forgetfulness
- trouble concentrating
- slow reaction times
- constipation (cannot poop)
- hormone changes
- moodiness
- lower sexual desire

Some side effects may continue to happen no matter how long you take opioids (such as constipation, hormone changes, changes in behavior, and physical dependence).

Hormone changes

Opioids may lower the levels of some hormones. This can change some ways that the body works, including how you feel about sex.
Women: Tell your doctor if you are taking opioid pain medicines, especially if you are pregnant or plan on getting pregnant. If you have a baby while taking these medicines, your baby will be physically dependent on opioids. Taking opioids is not linked to a risk of birth defects.
Men: Long-term opioid use may lead to low levels of testosterone, the male sex hormone. This could affect your mood, stamina (ability to keep up), desire for sex, and physical and sexual performances.

Working & Driving

Opioid pain medicines can cause some side effects (such as sleepiness) that can affect working and driving. These side effects are common when you first start the medicine or when you increase the dose. You should talk to your doctor about your job and if it is safe for you to work while taking opioids.
If you are taking opioids and want to get a driver's license, you will need extra tests (i.e. to test your reaction time) before you can start the driver's license application.

Alcohol and Controlled Substances

You should not drink any alcohol (beer, wine or hard liquor) or consume controlled substances while taking opioids. When mixed with alcohol or medications that can make you sleepy, the effect of these medicines can be stronger. Sometimes this can lead to a lower level of awareness and slow or even stopped breathing.

Do opioids used as pain medicines cause addiction?

Addiction is a problem where a person cannot stop using a drug even though the drug is harmful. An example would be a patient who is using opioids for mood effects, rather than for pain relief.

Figure 8. **Long-term opioid family education sheet.** This document lists some of the frequently asked questions (FAQ) about opioid use. It is meant to provide patients and their families with important information regarding opioids (BCH, 2013).

Family Education Sheet • *Frequently Asked Questions about Opioid Treatment for* Long-Term Pain

It is not common for people to become addicted when taking opioids for short-term pain from burns, wounds, and operations. However, people who have a history of addiction or mood disorders may be at risk for addiction to opioids.
The risks of long-term opioid use are not well known. Long-term opioid use for pain relief has not been studied except in patients with cancer. Many patients with cancer have safely used opioids for long-term pain relief.

What will happen if I suddenly stop taking my opioid pain medicines?

Physical dependence happens if you take certain drugs, including opioids, for a long time (more than 2 weeks). If you suddenly stop taking these drugs you will have withdrawal symptoms. Symptoms include shaking, anxiety, grouchiness, trouble sleeping, stomach cramps, diarrhea, pain, hallucinations and sometimes seizures. Withdrawal from opioids can be very unpleasant, but it is not usually dangerous. In most situations, we do not suggest stopping opioids suddenly. If you wish to stop taking opioids, you should slowly lower the amount you take over time.

Will opioids eventually stop working as pain medicines for me?

Many patients taking opioids for a long time will develop **tolerance**. This means the pain medicine becomes less helpful over time. In some cases, if the dose is raised the medicine will work well again for a long time. In other cases, the dose can never be high enough to give good pain relief. Not all patients will become tolerant and their dose will work well for them as long as it is needed.

When these medications are no longer needed, how do I dispose of these medications?

- Bring expired or unused prescription drugs to the local pharmacy.
- If you put medications in the trash, mix them with kitty litter or coffee grounds.
- Fold patches with medication on the inside and sticky sides outside and place in the trash.
- Flush controlled substance patches like Duragesic® (fentanyl) and Daytrana® (Methylphenidate) down the toilet to avoid abuse.

A ***Spanish*** version of this education sheet is available from your provider.

Figure 8. continued. **Long-term opioid family education sheet.** (BCH, 2013).

There were only four patients in total that had at least one Opioid Long-Term Agreement signed. These results could represent a lack of education in general about BCH opioid prescribing policies. If this is the case, then efforts to increase awareness could be made. These efforts could include, for example, hospital staff-wide email memos, or exposure at mandatory department meetings.

It is not known why the CRAFFT questionnaire, urine screening, and Opioid Long-Term Agreement were not documented. It may be that current templates for documentation in the medical record do not guide clinicians to include this information. It is also possible that further education of prescribers on local prescribing policies, which have been put in place for the safety of patients, is needed. When prescribers are unaware of opioid prescribing policies, their patients may end up uninformed of the consequences of and their responsibilities in managing long-term opioid prescriptions. Finally, it is also a possibility that clinicians are uncomfortable having conversations with patients and families about opioid addiction, misuse and abuse.

While the documentation supporting opioid prescriptions is seriously lacking within the ERM at Boston Children's Hospital, there is no evidence of inappropriate opioid prescribing. Many of the patients within this study are very sick and have extremely complex healthcare needs. For example, a patient with Duchenne's Muscular Dystrophy who is

virtually bed-ridden would have a very difficult time getting to and from the Pain Treatment Service outpatient clinic. In this, and other similar instances, there is little to no risk of patient opioid misuse, abuse, or diversion.

Boston Children's Hospital is a pediatric tertiary institution. This means that a patient's parent or guardian is often heavily involved in, or directly responsible for, making medical decisions and home care of the patient (depending on patient age and circumstance). While younger patients themselves may not be at risk for opioid misuse, abuse, or diversion, there is always the possibility that the parent or guardian is high risk for these behaviors. Thus, prescribers or other clinic staff should be sure to assess both patients *and* parents/guardians using the CRAFFT screening questions (Figures 2 and 3) for any high-risk drug behavior.

For patients that can report pain, the level of pain intensity is self-reported using the 0-10 Numeric Rating Scale, where 0 represents no pain, and 10 represents the worst pain the patient has ever experienced. The mean level of iacuity of cancer patients documented in the medical record is 5.2/10. This is much higher than the mean pain scores documented at Boston Children's hospital in 2010, 2011, and 2012 where the scores were 1.46, 1.34, and 1.3, respectively (Solodiuk, 2014). This discrepancy can be attributed to scarce ERM pain score documentation for patients on long-term opioids. It must be understood that the numbers

calculated from this chart review may or may not represent the actual experience of the patient because pain scores were not consistently documented in the EMR.

Also, because of inconsistencies in EMR documentation, it is difficult to distinguish whether or not long-term prescriptions are even helping patients with chronic pain. Pain is a subjective experience, which is what makes pain intensity scores so important. Pain scores operationalize and quantify a patient's pain experience into terms that physicians can understand and assess. They also provide a baseline physicians can use to gauge the efficacy of pain management. Ideally, a patient presenting with new chronic pain would report higher pain scores initially and lower pain scores after starting their long-term opioid therapy. Without proper and consistent documentation of pain scores, it becomes difficult to assess whether or not long-term opioids are an effective form of pain management. Thus, pain score documentation is important for physicians to practice good pain management.

Within this study, 25% of cancer patients developed pain throughout the course of their treatment and 12.5% were already experiencing pain at the time of diagnosis (Figure 5). This differs from previous literature, which reports that approximately 25% to 30% of patients with cancer experience pain at the time of diagnosis (Pharo and Zhou, 2005), and about 70% to 80% develop pain over the course of their

disease (Mercadante and Fulfaro, 2005). While the specific values are different, the studies do agree that a smaller percentage of patients experience pain at diagnosis than the percentage of patients that develop pain throughout their course of treatment. Specific differences may be due to the small sample size n=29 of this particular study, or the fact that this study is based on a pediatric population, and the previous studies were based on adult populations. Larger studies with pediatric populations across multiple geographic locations would yield more accurate results not only in terms of the timing of cancer pain presentation, but also in terms of understanding pediatric cancer pain.

Weight is an important demographic value with many clinical implications. More specifically, weight plays a crucial role in medication dosage. This is especially true in pediatrics, where drugs are primarily dosed according to body weight or body surface area. Therefore, inconsistent ERM weight documentation can pose issues in opioid prescribing. If a patient has gained weight, but such weight gain is not documented, then prescribers would not know to increase opioid doses. This would ultimately result in undertreated pain, which can have implications greater than the patient's immediate discomfort. As discussed earlier, unrelieved pain can lead to functional impairment, immobility, social isolation, emotional and spiritual distress, psychological stress, and

ultimately, a reduced quality of life (IASP, 2015 and Pergolizzi, et al. 2014).

The DFCI Oncology Clinic was much more consistent with documenting patient weight than other BCH services. Only 6.3% of all cancer patients had an undocumented weight. This is small compared to the 53.8% of all non-cancer patients that had no documented weight (Figure 4). This result is very likely attributed to the fact that oncology patients are very closely and frequently monitored due to the nature of the cancer treatment itself. Nausea and vomiting are very common side effects of chemotherapy and radiation therapy. Both of these can lead to sudden weight loss, which would be detrimental to a patient. There are also certain cancer drugs that can lead to sudden weight gain, which could put the patient at risk for medical problems such as obesity and diabetes mellitus type II. Aside from concerns with the general health of the patient, the DFCI Oncology Clinic must monitor weight for medication dosing purposes. Both chemotherapy overdosing and underdosing can be deadly for a patient due to the cytotoxic nature of the drug and the aggressiveness of cancer itself, respectively. Thus, cancer is a disease that requires close monitoring. This is most likely why the DFCI Oncology Clinic practices more reliable weight documentation in the ERM.

Comorbidities of anxiety and depression were very common with patients suffering from chronic pain and subsequent long-term opioid use.

Many of these patients had multiple health issues and very complex care. Advanced care needs seemed to decrease the patient's quality of life and thus, it almost comes as no surprise that anxiety and depression were common in this subset of patients.

Finally, the algorithm used to identify patients for this study was applied to four different quarters within the 2014 calendar year. This means that a separate list of patients on long-term opioids was generated four different times. Thus, patients that took long-term opioids throughout the entire calendar year should have appeared on this list for all four quarters. The chart review process showed that this was not the case. There were several instances where patients experiencing chronic pain were definitely taking long-term opioids beyond the single quarter they were listed under. There were just a few patients that were carried through all four quarters, but it was clear that more patients should have been. This does imply some degree of error within the algorithm and suggests that there may be more patients using long-term opioids than initially reported. Modification of the algorithm for future studies would hopefully resolve this issue.

Given the results of this study, it is evident that Boston Children's Hospital should take efforts to increase awareness of their opioid prescribing policies. This study has also highlighted several inconsistencies within the ERM documentation. It is important for the care

of the patient that ERM documentation is reliable and up to date. For this reason, clinical staff should be made aware of the inconsistencies in weight and pain score documentation. Both of the above-described issues must be addressed in order for physicians to practice good pain management. Therefore, Boston Children's Hospital should consider hospital staff-wide email memos and/or mandatory staff briefings to increase awareness about these issues.

LIST OF JOURNAL ABBREVIATIONS

BCH	Boston Children's Hospital
IASP	International Association for the Study of Pain
WHO	World Health Organization
JAMA	The Journal of the American Medical Association
J PAIN RES	Journal of Pain Research

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CURRICULUM VITAE

JENNY JAN

1247 Beacon St, Apt #3
Brookline, MA 02446 jennyjan91@gmail.com Born 1991

EDUCATION

Boston University (September 2013 – Present)
Medical Sciences, M.S. Candidate; Current GPA: 3.62

University of North Carolina at Chapel Hill (August 2009 – May 2013)
Biology, B.S. with minors in Chemistry and Anthropology

HONORS AND AWARDS

Dean's List – University of North Carolina at Chapel Hill (Fall 2012 and Spring 2013)

- Completed 2 semesters with a grade point average above 3.2, with no grade lower than a C when enrolled in fifteen or more credit hours

Buckley Public Service Scholar – University of North Carolina at Chapel Hill (May 2013)

- Completed a total of 308 hours of community service and 4 different skills training sessions, including: Green Event's training, CPR training, ONE ACT training, and HAVEN training.

WORK EXPERIENCE

Biostatistics Teaching Assistant – Boston University School of Medicine (January 2015 – Present)

- Responsible for running weekly review sessions, answering any questions students my have, proctoring 3 exams, and grading exams.

Medical Office Assistant – VitreoRetinal Consultants, Dr. Delia N. Sang (August 2014 – Present)

- Responsible for medical chart filing, answering phones, monitoring general front desk flow. Also completed two extensive chart review projects and scribe for the doctor on an as-needed basis

Research Assistant – Boston Children's Hospital, Department of Anesthesia (August 2014 – present)

- Analyzing opioid prescribing practices and long-term opioid use through a retrospective chart review. Writing a Master's Thesis as part of degree requirements for Boston University. Also spend 6 hr/week working in the Anesthesia Tech Workroom and observing surgeries in the OR.

Camp Counselor – Camp Timber Tops, Greeley, PA (Summer 2013)

- Was an Arts and Crafts Counselor responsible for creating and teaching various art projects. Was also a Bunk Counselor responsible for the well-being of 10 5th grade girls.

Ways of Helping – University of North Carolina at Chapel Hill, Department of Nursing, Dr. Jill B. Hamilton (Summer 2011)

- Involved in the evaluation of socio cultural and religious coping measures used in elderly African American cancer patients. Helped recruit patients for interview, gathered basic patient history and information, and transcribed completed interviews.

SHADOWING EXPERIENCE

Pediatric Emergency Department – University of North Carolina Hospitals (Summer 2011)

- Shadowed various nurses, residents, and physicians; listened to residents brief doctors on cases, observed nurses administer shots and medicines

Rex Outpatient Surgery and Urgent Care – Cary, NC (Summer 2008)

- Shadowed surgeons in outpatient surgery. Observed many ENT procedures, podiatric procedures, a cyst removal from neck, and other miscellaneous procedures. Shadowed nurses, MDs and PAs in urgent care. Observed triage procedures, suturing procedures, physical check-ups, and other clinical proceedings. Also helped restock rooms and organize medical files.

VOLUNTEER EXPERIENCE

bWell Center – Pediatric Outpatient Clinic, Boston Medical Center, (Spring 2014)

- Responsible for opening and closing the bWell Center, encouraged patients and their families to make healthy lifestyle choices, responsible for leading hourly activities with children in the pediatric waiting room.

UNC-Hospitals Volunteer – University of North Carolina at Chapel Hill (Spring 2010 – Fall 2012)

- Provided one-on-one recreational therapy to children in the Pediatric Play Atrium. Sorted donated medical supplies for donation to third world countries with MEDworld. Pulled and sorted histology slides in Surgical Pathology. Provided recreational therapy to children in the Pediatric Oncology Clinic.

AID (Assiting Individuals with Disadvatages) Summer Volunteer Program – ShuangXi, Taiwan (Summer 2010)

- Taught basic English to grade school students at Gan-Lin Elementary for 3 weeks. Developed lesson plans and prepared teaching materials. Worked with supervising school officials to create a healthy learning environment