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A Qualitative Analysis of the Health Informatics Role in Addressing the Public Health Crisis of Addiction and Overall Effectiveness of Treatment

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Abstract

In recent years, the implementation of Health Information Management (HIM) data systems has had significant positive impacts in nearly all aspects of both health and healthcare delivery. However, during this time, there has also been a dramatic increase in the demand for addiction and mental health treatment. The rising number of individuals requiring mental health treatment for addiction has resulted in its declaration as an urgent public health epidemic by the Department of Health and Human Services. The all-encompassing effects of addiction are prevalent in every subset of our society, seen most notably in the form of across-the-board rising healthcare costs, addiction related crime rate increases, overcrowded prisons, and an inefficient system of communication among overwhelmed mental healthcare professionals and law enforcement officials. The following qualitative survey was conducted in the form of a questionnaire provided to voluntary participants currently employed as medical and/or law enforcement professionals. Participants were selected based on their relevant experience with either treating addiction, and/or having firsthand experience with battling addiction themselves. Participants were encouraged to take into consideration the HIM systems in which they currently utilize when providing treatment, and provide evaluative input with emphasis on areas of desired future improvements and enhancements that may assist future HIM professionals envision more efficient mental health and addiction treatment database structures.

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Chapter 1

Introduction

Background

As a registered nurse relatively new to my career, I have treated a seemingly countless number of individuals over a period of four years who struggle with addiction. My nursing experience has consisted of rotations in acuities of care ranging from intensive care units, emergency rooms, trauma units, and long term care. Unfortunately, due to the rapid rate in which the fast-paced intensity of my thus far short lived medical career took off, I silently began a personal battle with addiction that nearly ended both my career as a nurse, and more importantly, my life. At the time of this study, I am currently 3 years sober, and actively participate with a routine drug and alcohol monitoring agency for medical professionals, funded by the state board of nursing. In addition to monitoring, I am also involved in both local and regional addiction recovery communities for medical professionals who have struggled with addiction.

A 2012 study by Bettinardi-Angres, K., et al, determines that substance abuse among medical professionals is considered to be approximately 11%, roughly the same rate of substance abuse among the general population. The same 2012 study credits a cultural and professional shift in attitudes towards drug use as the primary risk factors for substance abuse by medical professionals. Other major contributing factors included:

- Perceptions that drugs are an acceptable means of coping with personal and professional problems
- Developing an overarching faith in the ability of drugs to promote healing
- Rationalizing drug use on the basis of needing to continue functioning at a perceived level of effectiveness

- Feeling invulnerable to illnesses
- Developing a permissive or altruistic attitude toward self-diagnosing and self-treating physical pain or stress

In efforts to address ethical concerns such as substance abuse among medical professionals, states give accrediting boards of nursing (BONs) the power to regulate nurses in their jurisdiction. BONs are created by state legislation in the interest of protecting the public, allowing BONs to enact and enforce rules and regulations related to the practice of nursing in their state. These rules and regulations define what constitutes misconduct, unprofessional conduct, incompetence, and a determination of being unfit to practice (Dunn, 2005). BONs employ rules and protocols when they receive an allegation that a nurse has engaged in misconduct (see provision bullet points below). For most state BONs, these rules and regulations cover certain acts that are cause for disciplinary action against the nurse, including the following:

- Drug diversion (diverting a highly addictive controlled substance in a work setting with intent for personal use)
- Positive drug screen without a lawful prescription
- Violation of a state or federal narcotics or controlled substances law
- Criminal convictions including driving under the influence
- Illegal use of drugs or controlled substances
- Use of habit-forming drugs, controlled substances, or alcohol to the extent that the use impairs the user physically or mentally
- Failure to comply with the contractual provisions of the nurse's drug/alcohol monitoring program

Once misconduct has been identified, many state BONs offer an alternative to discipline program (ADP) to the affected medical professional, dependent upon the severity of the misconduct in question. If a medical professional admits to struggling with substance abuse addiction when confronted with alleged misconduct, ADPs are typically offered in the form of inpatient and/or outpatient addiction treatment, with a subsequent contractual agreement between the BON and nurse, contingent upon enrollment in an approved drug and alcohol monitoring program for a period of 3-5 years.

Medical professionals who participate in drug and alcohol monitoring programs are contractually obligated to do so, and as result, have a very unique system of accountability to ensure compliance. If and when compliance, or complete abstinence from drugs and alcohol is not maintained by the participant, their professional license is subject to immediate termination by their state licensing board (nursing, board of medical examiners, bar association, etc.). It is worth noting that not all states have these monitoring programs. Those that do, utilize electronic health information management (eHIM) programs specifically designed for the monitoring of individuals who have professional licenses issued by the applicable state boards for participating professions, such as medical, aviation, law, etc.

On a daily basis, participants in these programs are required to "check-in" either by telephone interactive voice response (IVR), or by logging into an online portal. When performing either of these two options, the monitoring participant is notified at the time of check-in whether or not they have been randomly selected for a drug and/or alcohol screen. Once the participant has received notification of a randomized selection for screening, they must provide a sample on the same day of notification. Check-in's are required to be completed by the participant between the times of 5 A.M. and 2:30 P.M.. The rationale behind this time frame is that it provides the

participant sufficient time to locate and make arrangements to appear at a pre-approved drug and alcohol testing facility. At the time the participant is notified of selection for testing on any given day, they are also notified the type of test required, and must then electronically select the appropriate local testing facility via the monitoring agency's online portal. Test options include urine drug screening (UDS), blood testing, and hair follicle testing. A missed check-in, or failure to provide a sample the day of randomized selection is considered non-compliance, and the participant may face disciplinary action equal to that of providing a sample testing positive for drugs or alcohol, which can include suspension or revocation by the state issuing board of their professional licensure.

This has proven to be a very effective system of accountability that I can personally attest to being a major contributing factor to my ongoing sobriety to this day; however, the benefits of state run drug and alcohol eHIM programs notwithstanding, it is by no means infallible, and in some ways, can be a very difficult system to adhere to.

On the day of a randomized selection for testing, the participant being monitored must make arrangements to provide the required sample at a testing site approved by the monitoring agency. It is the responsibility of the participant to make these arrangements, in addition to ensuring that time off work is used to provide the required sample if a testing site cannot be reached before or after working hours. Participants experience high levels of personal, professional, and financial stress due to the disruptions caused by the frequency and excessive out-of-pocket costs of testing. In some cases, individuals voluntarily withdraw from the program due to lack of funds to pay for continued on going testing, and subsequently lose their professional licenses and credentials, unfortunately resulting in some of these individuals facing relapse into active addiction once again.

The drug and alcohol monitoring program for medical professionals in which I currently actively participate, requires a monitoring period of 3-5 years. Each participant signs a contract agreeing to be randomly screened no less than 18 times per calendar year, which include at least 2 screens requiring blood samples, and 2 requiring hair follicle samples. Participants are responsible for the full out of pocket costs for all 18 screens, as they do not qualify for any preventative or ongoing care measures covered by health insurance policies. At the time of this study, the costs of urine screens for the monitoring program used in this example average $90 per screen, blood screens average $130, and hair follicle screens average $280. This equates to a total out of pocket cost to the participant of $2,000 per year.

It is my theory that the role of health information management accountability in addiction treatment that I have personally experienced, can be a vital tool in promoting sobriety among the general public if similar integration can be made into the state and federally funded healthcare resources at the present time and future.

Study Relevance

On average, approximately 14% of Americans who struggle with addiction make efforts to seek treatment (Bettinardi-Angres, K., et al, 2012). As previously outlined, the emergence of mobile technology has facilitated access to health information management protocols such as those used by state run drug and alcohol monitoring programs. Online portals which allow patient access to personal health information (PHI), has proven to be effective in improving adherence rates to essential care protocols such as medication regimens, and successful patient-physician engagement (Baldwin, et al, 2016). Though, a myriad of obstacles currently exists, primarily the level of patient medical comprehension and information technology proficiency. It is my belief that medical and health information professionals with a comprehensive understanding of

information technology and addiction treatment, can revolutionize the way in which care is delivered with the assistance of a more specialized health informatics focus on improving efficiency across all scopes of care, including mental health and addiction resources.

Through an open discussion with local and regional healthcare professionals, law enforcement officials, and mental health professionals in which I have either received treatment from or worked alongside, it is my hope that an qualitative analysis of the collective unique experiences and knowledge base in addiction, patient care, and healthcare information management can help to provide a beneficial evaluation of local and regional medical and law enforcement resources available to address the growing epidemic of addiction.

Definition of Key Terms

Controlled Substances Act (CSA): Statute establishing federal U.S. drug policy under which the manufacture, importation, possession, use and distribution of certain substances is regulated.

Drug and Alcohol Services Information System (DASIS): Primary source of national information on the services available for substance abuse treatment and the characteristics of individuals admitted to treatment.

Electronic Health Record (EHR): Electronic version of a patient's medical history that is maintained by the provider over time, and may include all of the key administrative clinical data relevant to that persons care under a particular provider, including demographics, progress notes, problems, medications, vital signs, past medical history, immunizations, laboratory data and radiology reports The EHR automates access to information and has the potential to streamline the clinician's workflow. The EHR also has the ability to support other care-related activities directly or indirectly through various interfaces, including evidence-based decision support,

quality management, and outcomes reporting (CMS, 2016).

Health Insurance Portability and Accountability Act of 1996 (HIPAA): United States legislation that provides data privacy and security provisions for safeguarding medical information.

Mental Health Parity and Addiction Equity Act (MHPAEA): Legislation signed into United States law on September 26, 1996 that requires annual or lifetime dollar limits on mental health benefits to be no lower than any such dollar limits for medical and surgical benefits offered by a group health plan or health insurance issuer offering coverage in connection with a group health plan (USDOL, 2016).

Narcotic: A drug that relieves pain, induces drowsiness, stupor, or insensibility, which is used legally for medicinal purposes, or illegally for non-medicinal purposes.

Nursing Informatics: Specialty that integrates nursing science, computer science, and information science to manage and communicate data, information, knowledge, and wisdom in nursing practice. Supports consumers, patients, nurses, and other providers in their decision making in all clinical roles and settings.

Personal Health Information (PHI): Also referred to as Protected Health Information, generally refers to demographic information, medical history, test and laboratory results, insurance information and other data that healthcare professionals collect to identify an individual and determine the appropriate level of care.

Prescription Drug Monitoring Program (PDMP): Tool that can be used to address prescription drug diversion and abuse. PDMPs serve multiple functions, including: patient care tool; drug epidemic early warning system; and drug diversion and insurance fraud investigative tool (ONDCP, 2016).

Substance Abuse and Mental Health Services Administration (SAMHSA): Branch of the U.S. Department of Health and Human Services, charged with improving the quality and availability of prevention, treatment, and rehabilitative services in order to reduce illness, death, disability, and cost to society resulting from substance abuse and mental illnesses.

Substance Dependence Treatment Information Systems (SDTIS): Alternate source of national information on the services available for substance abuse treatment and the characteristics of individuals admitted to treatment.

Chapter 2

Review of Literature

Research in the arenas for which health information management has impacted and will impact going forward, not only the treatment of, but also the prevention of addiction is limited. In my personal experience, both as a medical professional and recovering addict, this is largely due to lack of state and federal funding, in addition to lack of public interest resulting from the negative societal stigma placed upon the corresponding mental health issues that plague individuals struggling with addiction. Consequently, as a result of my personal and professional battles with addiction and substance abuse, this is a subject matter for which I take personal stock.

To further investigate these issues, the following is a culmination of literature pertaining to both addiction treatment and health information management dating from year 2000 to present that I was able to obtain through database searches utilizing resources such as PubMed, CINAHL, and Science Direct. In efforts to ground the research for this qualitative study on information as current as possible, resources were limited to publications dating from 2010 to 2016.

The Addiction Crisis

Addiction is not confined to any particular group of substances, material possessions, activities, cultures, ethnicities, socioeconomic class, or gender. Chances are that either you yourself, or someone dear to you has struggled with a form of addiction at some point or another during their lives. When most individuals think of addiction, drugs and alcohol are the first and most notable culprits we imagine, as their effects are the most dangerous and life threatening to ourselves and those around us. Frequently prescribed narcotic pain killers called opioids, also synonymously called opiates, are one of the most physically addictive substances known to science. Opioids are classified as a Schedule II drug by the Controlled Substances Act (CSA) of

1970 and are currently accepted for medical use in treatment in the United States, or a currently accepted medical use with severe restrictions. The CSA also identifies the class of medicine as having a high potential for abuse which may lead to severe psychological or physical dependence (DHHS, 2009)

The Controlled Substances Act (CSA) Title II of the Comprehensive Drug Abuse Prevention and Control Act of 1970 is the federal U.S. drug policy under which the manufacture, importation, possession, use and distribution of certain narcotics, stimulants, depressants, hallucinogens, anabolic steroids and other chemicals is regulated. The CSA was signed into law by President Richard Nixon on October 27, 1970, unofficially beginning the nation's War On Drugs campaign. Since the inception of the CSA, the addition, deletion or change of schedule of a medicine or substance may only be requested by the U.S. Drug Enforcement Agency (DEA), the Department of Health and Human Services (DHHS), the U.S. Food and Drug Administration (FDA), or from any other party via petitioning the DEA (DHHS, 2009).

Growing Opioid Epidemic

Opioid medications are synthetically derived chemicals taken from opium plants, and act a painkiller by slowing down, and thus dulling electrical signal transmission in the body's central nervous system, allowing the brain to perceive pain in a way that exponentially lessens its intensity. Though this is the medications primary purpose, it also elicits other physiological effects, such as a slowing of gastric motility known as peristalsis, nausea, lethargy, decreased appetite, and euphoria resulting from a massive release of the neurotransmitter dopamine. The release of the neurotransmitter dopamine caused by opioids, give way to the street name of "dope", and is what actually triggers physiological and psychological addiction. Opiates are manufactured in strengths ranging from weak enough to be prescribed in chewable form by a

veterinarian for your pet Boston terrier after a simple tooth extraction, to concentrations being strong enough that can be used as a general anesthetic for humans during major surgical procedures such as the amputation of a limb.

Depending on the dosage and timeframe opioids are taken, physical dependence, a commonly substituted medical term for addiction, can set in over a period of a few days. As a result, increases in opioid prescriptions have consequently sent addiction rates sky rocking as more and more individuals find themselves becoming addicted, often causing them to continue taking opioid medications for dangerously longer periods of time than is medically necessary. According to Compton et al., 2016, a total of 10.3 million individuals in 2014 reported using prescription opioid medications for reasons in which they were not prescribed to them, or reported opioids were only taken to experience the feeling of euphoria that they caused. Areas of most concern were emergency room visits involving the misuse or abuse of prescription opioids that have increased 153% from 2004 to 2011, and patient admissions to substance abuse treatment programs linked to prescription opioids more than quadrupled between 2002 and 2012. Most troubling, between 2000 and 2014 the morbidity and mortality rates from prescription opioid overdose nearly quadrupled from 1.5 to 5.9 deaths per 100,000 persons. Over 165,000 prescription opioid related fatalities were recorded in 2014, resulting in the Department of Health and Human Services labeling opioid addiction as a major public health epidemic (DHHS, 2016).

Health Information Management and Addiction

Prescription Drug Monitoring Programs (PDMP) are currently being utilized in most states as a means of identifying physicians who over prescribe narcotics, and serve as a deterrent to patients who routinely seek duplicate prescriptions for narcotics, commonly referred to as “doctor shopping”. This was a landmark approach as being the first major health information

management tool utilized both for identifying and preventing prescription related drug addiction. As a former emergency room nurse myself, I can attest to the potential disruptions this can cause in an acute patient care environment. Though PDMP was initially designed for use by law enforcement (Irvine, J.M, et al, 2014), the eventual implementation of such a monitoring program into the medical community allowed prescribing physicians for the first time to review a patient's prescription history in real time during an emergent or scheduled visit. A study by Dormuth, Miller, Huang, Mamdani, & Juurlink, (2012) concluded that one of the first PDMP databases named PharmaNet utilized in Canada resulted in a dramatic decrease in narcotic prescriptions (Figure 1). Patient safety may be assumed to be in possible danger, effecting the delivery of care, if multiple ongoing narcotic prescriptions are seen as been recent and current, yet a patient is presenting with an excessive amount of pain. Pain is always investigated and addressed appropriately in an acute care setting, however depending on the findings, this patient may not be discharged with a narcotic prescription, or as is common practice among many emergency room physicians, a prescription for 2-3 pills may be issued along with a strong recommendation to follow up with a physician of the appropriate specialty within 24 hours.

A 2014 qualitative study by Hildebrand, C., et al, assessed the frequency of PDMP use by prescribing clinicians from pain management, emergency and family medicine, psychiatry/behavioral health, rehabilitation medicine, internal medicine and dentistry. The results of this study demonstrated that while PDMP is not used 100% of the time by all prescribers, physicians from pain management clinics did utilize PDMP for nearly all patients, while other scopes of care utilized PDMP primarily for new patients, narcotic prescriptions only, or suspected drug seeking patients. One of the first extensive studies on the effectiveness of PDMP utilization was conducted by Wilsey & Prasad in 2011, which concluded that participating emergency room

physicians in the state of Ohio which frequently accessed PDMP during patient visits, most altered their chose of prescription drug and dosage after reviewing the patient's prescription records. To be specific, 61% of these revised prescriptions were decreased, and 39% increased once detailed current prescription records were accessed.

One of the more relevant PDMP studies reviewed also incorporated how prescribers confronted suspected addiction with their patients. Irvine, J.M., et al (2014) conducted a PDMP utilization survey of 1065 Oregon physicians currently practicing in primary care, emergency medicine, and pain clinics. At the time of the survey, 95% of the prescribers participating in the survey reported accessing PDMP when treating a patient suspected of drug abuse. Approximately half of prescribers surveyed reported accessing PDMP when treating new patients, or prescribing controlled substances to patients not suspected of drug abuse. Virtually all participants reported discussing troublesome PDMP data that indicated possible drug addiction with their patients at the time of treatment. Of the prescribers which reported discussing the possibility of addiction with these patients, mental health or addiction treatment referrals were made 54% of the time, and 36% indicated that the patients were involuntarily discharged from being treated at their practice. Of this subset of patients confronted with the possibility of addiction, most physicians reported their patients expressed denial and anger, with only a few occasional requests for recommended substance abuse treatment. As a result of confronting patients concerning addictive behavior, there has become concern around PDMP-driven patient dissatisfaction. A 2014 study by Islam & McRae surmised that doctors who refuse to prescribe opioids to certain patients out of concern about abuse are likely to get a poor survey-ratings, which can affect physicians' reimbursement and job security (Table 1).

These studies demonstrate that Health Information Management in the form of PDMP can serve as a potential tool in identifying patients who may be either knowingly or unknowingly struggling with addiction. More research is needed to optimize and improve the ways in which healthcare professionals utilize HIM to uncover and respond to suspected and actual substance abuse.

Treatment Disparity

As part of the Troubled Asset Relief Program (TARP) in 1996, congress passed the Mental Health Parity and Addiction Equity Act (MHPA), requiring healthcare insurance policies to include annual and lifetime limits in coverage for mental health and addiction treatment, services which were not required to be covered by insurance companies up until that time. Ettner, S.L., et al, (2016), concluded that since the inception and implementation of MHPA, the rate of individuals seeking mental health or addiction treatment has seen little change among the segment of the general population which currently have the health insurance to cover it. From personal experience, I can attest to the fact that many individuals requiring or seeking mental health and/or addiction treatment, do not have the insurance to cover any portion of it, nor do they possess the financial means with which to pay any portion of the costs out of pocket.

Whether medical professionals choose to recognize the issue or not, it has also been my experience that factors such as our preconceptions of racial and ethnic minority groups, and socioeconomic status, play a role in how we treat and even prescribe medicine. One such 2013 study by Joynt, M., et al, came to similar conclusions by analyzing data from the National Hospital Ambulatory Care Survey (NHAMCS) of the prescribing of opioids to adults aged 18 years and older for patients presenting to the emergency room with a complaint of moderate to severe pain from 2006 to 2009. Patients from lower socioeconomic neighborhoods were found to

be less likely to receive opioid pain medication when compared to patients from more affluent neighborhoods who reported the same levels of pain. In addition to these findings, black and Hispanic patients were also found to be less likely to receive opioid pain medication when reporting the same level of pain as all other ethnicities by a rate of 46.4% for all other racial groups, to 38.7% for black and Hispanic patients. Though more research in these areas are much needed, possible reasons for this disparity may be that prescribers assume their minority patients from lower socioeconomic neighborhoods may not have access to pharmacies which utilize the appropriate technology needed to ensure adherence to opioid prescription guidelines (Anderson, D., et al, 2015), or that they may lack the health insurance or financial resources necessary to seek treatment if they were to experience addiction as a result of prolonged opioid use.

Big Data: The Secret Weapon to Fight Addiction?

Health information management has been utilized worldwide in recent years to treat addiction. These database structures are commonly referred to as Drug and Alcohol Services Information Systems (DASIS), or Substance Dependence Treatment Information Systems (SDTIS), both of which refer to health information management systems which collect, analyze, and report data related to addiction. The need for these specialized databases can be validated by fact that substance abuse and addiction has such far reaching implications in today's society that the World Health Organization (WHO) lists narcotic drug addiction in the same class as environmental pollution, poverty, and violent crime as one of the top challenges facing our generation (Ajami, S., et al, 2015). As is the case with the prevention and management of any mental or physical health condition, reliable and secure information management plays a crucial role in identifying and implementing the appropriate care regimens for each patient. In another word, when accurate and timely substance abuse data is managed by any given city, state, or

region, this increases the probability that commensurate levels of funding, care resources, and personnel can be allocated to adequately address addiction rates in these areas. The United States utilizes the DASIS system introduced by the Substance Abuse and Mental Health Services Administration (SAMHSA) in 1992, which focus on three subsets of data to treat addiction: System Data Set (SDS), Minimum Data Set (MDS), and Supplementary Data Set (SuDS). The objective of this information system is provide data about substance abuse and addiction treatment such as admission and discharge information, patient demographics, and performance measurement of substance abuse treatment programs (Ajami, S., et al, 2014).

Chapter 3

Methodology

Research Design

This study was a qualitative narrative review divided into five phases: literature collection, assessing, and collection; qualitative interviews with a survey questionnaire prepared by the researcher, and analysis of participant responses. Literature was located with the assistance of database searches using PubMed, CINAHL, ScienceDirect, and Google Scholar. Search terms included a relevant combination of keywords such as: addiction, substance abuse, substance dependence, opioid abuse, PDMP, health information management, informatics, registry, DASIS, mental health. Articles were chosen based on the researcher's decision as to their relevancy to this study.

Population and Sample Design

Focus group recruitment for interviews was conducted by phone or email by the researcher. Potential participants were chosen based on the relevancy to this study of their profession within the medical community or law enforcement. Inclusion criteria consisted of two primary key elements:

- The participant must be a currently practicing medical or law enforcement professional
- The participant must have prior professional experience with either treating addiction, or assisting individuals in locating treatment for addiction.

Profile of Sample or Population

Other factors taken into consideration during participant selection included professional credentials (e.g., medical doctors, nurses, narcotics detectives, addiction counselors) and clinical practice settings (e.g., urgent care clinic, primary care, emergency room, psychiatry office). Upon

initial participant contact, an explanation of the study was given, relevancies for which they were selected were identified, and a broad outline was provided of the survey questionnaire that would be forwarded to them if agreeing to participate. Of approximately 30 individuals contacted, 12 individuals verbally agreed to participate in this study.

Representativeness of Sample

Provided the relatively low number of participants in this study, responses to the survey questionnaire used in this study may not provide the reader with an accurate representation of perspectives held by the larger medical and law enforcement community. As a result, efforts were made by the researcher to retain participants from a broad range of professional experiences in order to explore generalized perspectives regarding addiction among the medical and law enforcement communities.

Data Collection Procedures

Participants were provided via email a consent form and survey questionnaire which included 15 question and answer sections for the participant to address. A timeline of two weeks to provide input to the survey questionnaire was presented to each participant. Notice of the possibility for follow up questions and clarifications were included within the consent form, allowing the participant to either accept or opt out of further contact after submitting their responses to the questionnaire.

Data Collection Instrument

Survey questions presented to participants were designed by the researcher to elicit critical thinking and analysis based on the participant's personal and professional experiences relevant to this study. In addition, the personal and professional experiences of the researcher greatly influenced the design details of each question. An introduction included within the survey

questionnaire advised participants that they may skip any questions they did not feel were pertinent to their personal or professional experiences, though an attempt to answer all questions were encouraged. Follow up questions were presented to three participants who expressed willingness via a consent form, to elaborate on broad points of perspective covered in brief within their responses to the questionnaire. Follow up questions were focused on issues determined by the researcher to be major points of interest relevant to this study.

Data Analysis

Once participant responses were returned to the researcher after the deadline, a qualitative analysis was performed by comparing and contrasting participant responses with data research found in similar studies. The Microsoft Office application Word was used to create the bulk of this report, and Excel was used to create a data table included in the appendices section of this study.

Research Questionnaire

1. **Is there a segment of the general population that you view as being at a higher risk for addiction?**

   Rationale: Gather a baseline of the participant's preconceptions as to whether they perceive addiction as an issue isolated to any particular socioeconomic or ethnic groups. This question is also designed to illicit responses that may identify the possibility of bias, perceived stereotypes or animosity, in addition to allowing the researcher to gauge the participant's prior exposure, either real or perceived, to addiction and the communities/individuals commonly affected.

2. **Describe what would you attribute to be the primary reasons for the increasing rates of substance abuse and addiction both locally and nationally?**

Rationale: Depending on the participant's personal and professional experiences with addiction, in addition to their prior exposure to individuals either in active addiction or receiving treatment for addiction, this allows participants to elaborate on their responses to the prior question, providing the researcher insight as to how personal/professional experiences influence their perspective.

3. **What do you perceive as the major barriers currently in place that prevent the most effective use of the resources currently in place for medical professionals to treat addiction?** ***(are there specific policies?, inadequacies of data gathering and analysis?, communication gaps across care regimens?, etc.)***

   Rationale: Allows medical professionals, a majority of the participants in this study, to express their general overall concerns with the addiction treatment resources, policies, and protocols currently available. Several participants responded to follow up questions presented to them by the researcher in which several major points that were briefly expressed by the participant in their original response could be discussed in more detail. This information will be covered in the analysis portion of participant responses to this study.

4. **Health Informatics is the study of information technology and how it can be applied to the healthcare field. It includes the study and practice of an information-based approach to healthcare delivery in which data must be structured in a certain way to be effectively retrieved and used to determine appropriate treatment. If applicable, in what ways does health informatics improve your current scope of duties, and in what ways would you like to see it improved?**

Rationale: Provided the integration of EHRs and PDMPs into the clinical environment in recent years, this question provides participants the opportunity to perform critical thinking analysis as to how these health informatics innovations have improved their overall ability to provide quality care. The participant is also given the opportunity to elaborate on ways in which they either anticipate or prefer to see these HIM innovations improve in the future.

5. **Addiction can often go untreated in individuals who lack the financial resources to pay for treatment. Many of these individuals resort to committing crime to either obtain drugs and/or money to obtain drugs. For individuals who wish to end this cycle and voluntarily present their narcotics and paraphernalia into law enforcement, would it be more appropriate for them to face arrest, or be helped to immediately enter an addiction treatment program (beyond detox) regardless of their ability to pay for it?**

   Rationale: Starting in 2015, law enforcement officials in many states implemented addiction protocols that give drug addicts the opportunity to voluntarily walk into a police station, hand over their drugs and paraphernalia, and instead of face arrest, they are assisted with locating and immediately entering a detox and addiction treatment program. This question was designed to obtain the perspective of medical professionals regarding this innovative new protocol used by law enforcement to help addicts seek treatment rather than face punitive measures.

6. **In what ways would you prefer to see emerging health information exchanges benefit the coordination of addiction and mental health treatment across all disciplines of care, including law enforcement?**

Rationale: Building upon the response of participating medical professionals to the previous question, this provides the participant to envision future innovations in addiction treatment and ways in which they would prefer to see health informatics improve the coordination of treatment among medical professionals, mental health professionals, and law enforcement.

7. **Healthcare Professionals: Given your average current patient population, what percentage of patients would you estimate you treat on daily/weekly/monthly basis either directly for addiction *(openly seeking addiction treatment)*, or indirectly *(drug seeking behavior)*? Have you observed an increase/decrease in either of these patient populations over time?**

   Rationale: Allows the researcher to perform a comparative analysis on either the real or perceived frequency of care relating to addiction that participating medical professionals view the average patient population they currently serve, with emphasis on whether there is an increasing or decreasing trend.

8. **If you provided an answer to question #7 above, do you or your organization utilize a prescription drug monitoring program (PDMP) when prescribing controlled substances? If yes, do you utilize PDMP for all controlled substance prescriptions, or primarily for new patients, or suspected drug abuse?**

   Rationale: As outlined in the literature review of this study, PDMPs have been the first major use of HIM in treating and/or preventing addiction. This question allows the researcher to analyze the frequency of use of PDMPs by the medical professionals participating in this study.

9. **Law Enforcement Professionals: What percentage of criminal acts in your district would you estimate are committed either directly or indirectly related to addiction? Have you observed an increase/decrease in this behavior over time?**

   Rationale: Provides researcher with perspective of law enforcement professionals viewpoints on the direct relation between addiction and crime rates.

10. **What do see as the primary barriers in place that prevent these individuals from receiving treatment?**

    Rationale: Law enforcement professionals undoubtedly have a unique perspective on the effect addiction can have on public safety. This question is intended to discover the extent to which law enforcement professionals have involvement with addicts who require and/or have received treatment for addiction, and how this experience influences their perspectives on the availability of, and quality of treatment.

11. **In your estimation, would you consider the state and federal healthcare resources currently in place to address the rising rates of addiction to be adequate? Please indicate areas where you assess more or less allocation of resources such as personnel, funds, and information management technology would be beneficial.**

    Rationale: Provides the researcher with the overall impression of participants regarding the benefits and disadvantages of the resources currently at their disposal to assist addicts with treatment.

12. **In recent years, there has been a growing popularity of health information tracking apps for mobile technology. The most notable of which are Personal Health Information portals where users and their physicians can track and view information such as**

fitness, vitals, and dietary consumption. In what ways would you envision this technology to benefit individuals struggling with addiction and/or mental health conditions?

Rationale: As PHI portals have become more widely available in recent years, this allows participants to evaluate the efficiency of their personal and professional experiences with PHI portals, and ways in which they envision the efficacy of future integration of mental health and addiction treatment services into PHI portals.

13. **In April 2016, Tennessee implemented a controlled substance monitoring database in which healthcare professionals who are legally authorized to dispense a schedule II, III, IV or V controlled substance are required to submit certain data to a controlled substance monitoring database. If you are employed in the healthcare industry, has the rollout of this database had any effect on the rate of drug seeking patients? If you are employed in healthcare or law enforcement, are there any areas where you anticipate loopholes may be exploited by either healthcare professionals or drug seeking patients?**

    Rationale: Given the relative infancy of controlled substance monitoring database use among medical and law enforcement professionals, this provides a quality assessment of this database by professionals which have direct contact with individuals struggling with addiction.

14. **If you or a loved one has struggled with addiction, please briefly explain what have been both the positive and negative experiences with seeking treatment. Please describe any areas where you envision improvements can be made with the assistance of more efficient healthcare data systems.**

Rationale: Where applicable, allows the participant to elaborate on their personal experiences with addiction treatment, and provides the researcher with insight as to how these experiences may affect their professional perspectives on addiction and addiction treatment.

15. **Chances are you have a mobile technology device of some kind, cell phone, tablet, computer, etc. As technology and access to information becomes increasingly more mobile, in what ways would you like to see mobile devices in the future have the ability to help you manage your physical and mental health?**

    Rationale: With previous questions referencing health information exchanges, PHI portals, and PDMPs, this provides participants the opportunity to envision ways in which access to health information on mobile devices can impact the delivery of care with respect to mental, in addition to physical health.

Chapter 4

Results

Response Rate

Twelve individuals expressed verbal consent to the researcher of their willingness to participate in this study, and were subsequently provided with a consent form and survey questionnaire. 100% of these participants returned survey questionnaires that were used in the analysis portion of this study. Participants which provided their responses to the survey questionnaire included the following medical and law enforcement professionals:

- Certified Registered Nurse Anesthetist currently employed at a local anesthesia group
- Nurse Practitioner currently in private family practice locally
- Emergency Room Physician currently practicing in Florida
- Pharmacist currently employed, who also has prior history of addiction treatment
- Registered Nurse currently employed as a Nurse Informaticist in Arkansas
- Registered Nurse currently employed in a Medical/Surgical Unit at a local hospital; this participant also has a previous history of addiction, and is currently enrolled in the same substance abuse monitoring program as the researcher of this study
- Registered Nurse Educator currently employed at a local university
- Registered Nurse currently employed as a Heart Transplant unit coordinator in Louisiana
- Registered Nurse currently employed as an ICU charge nurse in Louisiana
- Registered Nurse currently enrolled in a Family Nurse Practitioner program
- Detective in a Narcotics Unit currently employed at local county sheriff's office
- Psychologist currently serving a primary patient population of individuals struggling with addiction

Reliability of Instrument

Of the nine survey questionnaires completed by participants, all nine were incomplete. This was anticipated by the researcher as two questions were expected to not be applicable to all participants. One question was addressed solely to law enforcement professionals, and another addressed to participants who may have had personal experiences with addiction in the past. All questions applicable to each participant's profession were addressed within the survey questionnaires with exception to participants who chose not to address either one or both of these two questions.

Analysis of Research Question Responses

1. Responses were concentrated on areas of concern regarding lack of addiction and mental health treatment availability to individuals without health insurance coverage. Opinions on the risk factors associated with socioeconomic status were mixed, with some participants indicating that they perceived lower socioeconomic groups to be at higher risk, while other participants indicated that the highest socioeconomic groups were at greater risk due to their financial means to pay for drugs. Other risk factors according to participant responses:

- Biological predispositions to addictive behaviors
- Lower socioeconomic groups at perceived higher risk among majority of participants
- Lack of family, peer, and professional support structures
- Inadequate or non-existent accountability measures in place to maintain sobriety
- Stressors (financial, relationship, professional, political, legal, etc.)
- Mental health status (depression, anxiety, PTSD)
- History of mental, emotional, physical abuse
- Inability to adapt to, or non-conformity to healthy coping mechanisms

- Cultural shift towards a more accepting viewpoint of substance abuse
- Lack of strong spiritual and/or religious convictions
- Individuals with inappropriately managed chronic pain
- Individual curiosity leading to experimentation and ultimately addiction
- Unemployment or lack of job prospects; little to no sense of upward mobility

2. Nearly all participants concluded that the ease of access to prescription medications has been the primary driving factor in the increasing rates of addiction both locally and nationally. Responses from participants in this study indicate that the perception among medical professionals is that historically, physicians liberally use highly addictive opioid pain prescriptions as the first line of defense when treating pain, rather than first attempting alternative measures. These measures include non-opioid anti-inflammatory pain medications, acupuncture, alternating hot and cold compresses, physical therapy, daily stretching, exercise and/or dietary changes. Dissatisfaction was also expressed by participants that changes within the healthcare industry are increasingly placing higher incentives on patient satisfaction surveys, resulting in physicians being more apt to issue narcotic pain prescriptions to maintain high levels of patient satisfaction, and therefore increasing financial incentives to the prescriber and healthcare organization. Additional concerns were expressed regarding the following issues as being major contributing factors to increasing rates of individuals struggling with addiction:

- Family medicine cabinets which contain addictive prescriptions that can be abused by other family members
- Pain clinics which can inadvertently introduce a large number of prescription narcotics into black market “pill mill” circulation

- Lack of insurance or high deductibles that lead to an inability to seek alternative pain treatment measures, causing individuals to illegally obtain or steal prescription narcotics
- Inadequate education available to, or presented to the public regarding the potential danger of addiction when using prescription narcotics
- Increasingly relaxed society viewpoint towards alcohol consumption and marijuana legalization that can lead to potential polysubstance abuse

3. Participant responses consistently stressed that past and present social stigmas associated with addiction, prevents a large majority of addicts from seeking treatment out of fear of facing personal and/or professional consequences. Concerns were also raised among participants that individuals struggling with addiction who do come forward seeking treatment, find themselves in a healthcare system that has limited and inadequate resources, due in large part to a lack of training among nursing staff to treat addicts beyond physical detox, and gaps in communication between emergency medical services and mental health/addiction treatment professionals. Additional responses consisted of the following:

- Lack of insurance/financial resources to pay out of pocket for addiction treatment
- Propensity of medical professionals to rely on a Medication-Assisted Treatment (MAT) regimen that has low rates of success since rather than detox, this regimen slowly weens patients off opioid dependence by prescribing lower dose opioids such as Suboxone and Methadone.
- Overwhelmed therapists and counselors due to increasing need for addiction and mental health treatment
- Inability to enter immediate addiction treatment due to lack of room at local facilities

4. A majority of participants indicated that the implementation of either EHRs and/or PDMPs into their daily clinical workflow has demonstrated promising results in their efforts to treat and prevent addiction. Those which utilize both stated that these tools allow them the opportunity to cross reference previous patient visits with diagnosis and prescriptions, allowing the participant to identify trends that may alert them to the potential drug seeking behavior among some patients. Future HIM improvements were suggested by participants to include easier access to facility/organizational policies; a more easily navigable graphical user interface; and the integration of more clinical research data that allows EHRs to provide a wider range of applicable evidence-based treatment modalities. According to participants, other areas of observed clinical workflow improvements with the application of HIM technology were:

- Ability to enter diagnosis history into EHRs in order to determine the most appropriate level of care based on evidenced-based practices
- Improved charting times, providing nursing staff more time for hands-on patient care
- EHR reminders which improved overall quality of care by ensuring accurate medication administration times, improving patient safety measures by the integration of procedural checklists, and more timely and accurate electronic order entry via Computerized Physician Order Entry (CPOE) systems

5. A common theme observed among participant responses was that it is largely perceived in the medical community that rising healthcare costs associated with addiction treatment, and increasing state/federal costs of overcrowding correctional facilities, could undoubtedly be offset if addiction and mental health resources are made available to individuals who voluntarily appear at law enforcement institutions in order to turn over their narcotics and seek

immediately addiction detox and treatment. This sentiment is not shared pertaining to addicts caught by law enforcement to be conducting criminal activity as opposed to those voluntarily appearing at police stations seeking addiction help. Other factors such as prior arrest records and outstanding warrants must also be taken into account according to participants when assisting law enforcement with justifying treatment vs incarceration. Some respondents held such strong convictions on the topic posed in this question that they had indicated they would be in favor of paying higher taxes or insurance premiums if it would guarantee that additional addiction treatment and mental resources could be made available to the criminal element of general public. Additional viewpoints of participants included treatment alternatives such as access to free or low cost substance abuse monitoring programs such as those outlined in the introduction of this study.

6. For medical professionals, health information exchanges allow for PHI across all scopes of care (i.e. cardiology, respiratory, endocrinology, oncology, etc.) to be reviewed when determining the appropriate level of care. Participant responses largely skewed towards a preference of future EHRs incorporating mental health, addiction, and criminal history into every patient's PHI profile, allowing for a more holistic approach to a quality of care that addresses the physiological, mental, and emotional needs of the patient. Concerns raised by participants regarding this preference consisted primarily of the confusion this integration into health information exchanges would present to healthcare policies, procedures, and the protection of confidential patient information. The perceived benefits of this integration according to participants included:

- Providing a more collaborative system of communication and cooperation among law enforcement and the medical community when assessing treatment vs incarceration.

- Allows law enforcement professionals access to past and present physical/mental health treatment of individuals who voluntarily seek addiction help and turn over narcotics in their possession that would otherwise be used either by themselves or returned to public circulation.
- Integration could lead to opportunities within local district attorney offices to establishing a team of local law enforcement and medical professionals who would specialize in the rules, regulations, and application of a more collaborative effort to combat the increasing rates of addiction and addiction related crime.

7. While some participants were unable to estimate an approximate percentage, half of the respondents in this study indicated that approximately 5% to 50% of the patient population which they currently serve struggle with some form of substance abuse, with a noticeable increase in recent years of drug seeking behavior by patients.

8. A total of three participants responded to currently utilizing PDMPS, and indicated that their use is primarily when checking patient prescription history prior to prescribing a controlled substance for new patients, or patients with suspected drug seeking behavior.

9. An estimation from the law enforcement official participating in this study indicates that approximately 95% of local and regional crime can be directly attributed to drug and alcohol addiction.

10. Limited access and availability to the poorly funded mental health care and addiction treatment system resources currently available are the primary barriers according to the law enforcement professional participating in this study.

11. Responses were notably more visceral regarding this issue. An overall sense of frustration was expressed by all participants with the current availability of mental health and addiction

treatment resources currently available. Some of the most commonly expressed concerns among participants included:

- Access to addiction treatment is virtually nonexistent to individuals without insurance or the financial resources to pay for out-of-pocket services
- Availability of state and federally funded mental health and addiction treatment programs
- Too few individuals graduating educational institutions with degrees in psychology, and/or addiction treatment certifications
- Complex system of provider reimbursement for services rendered
- High rates of patient relapse and noncompliance can result in provider burnout
- Addicts facing legal issues have far less of a chance to enter a treatment program due to increased risk taken on by the provider
- Increased need for outpatient treatment resources (i.e. halfway houses, job placement, drug/alcohol monitoring programs) to maintain sobriety among recovering addicts
- Early detection measures to deter drug use such as random drug and alcohol screens are often not implemented by employers for fear that employees testing positive will be thrown into a time consuming, inadequate and expensive mental health and addiction treatment system.

Despite the second part of this question allowing participants to offer suggestions for areas where they envisioned potential improvements could be made to existing mental health and addiction treatment resources, responses gave way to a more critical evaluative assessment of these resources, as opposed to offerings of exact courses of action to address the criticism of these resources. Absent of specific corrective proposals by participants, it was determined by

the researcher that the intent of evaluative assessments of these resources by participants were to be interpreted as a generalized need to address the overall inefficiencies of these resources (i.e. manpower, funding, access, etc.).

12. Approximately half of participants surveyed were able to envision potential benefits from future innovative electronic app-based tools to assist recovering addicts, such as:

- Ability to maintain a diary-like daily log of emotions, memorable moments, medication compliance, dietary intake, exercise, and social interactions
- Preventing social isolation through easily accessible social media groups designed specifically for recovering addicts, where they can provide peer support, share experiences and success stories
- Providing access to an online group of mental health and/or addiction treatment professionals who can provide immediate interactive care in a crisis situation where immediate access to a mental health professional is not available
- Access to a database that can provide location and instruction on how to obtain and use the opiate overdose reversal drug Naloxone in an emergent situation

13. Participants indicated that PDMPs such as the controlled substance monitoring databases now in use throughout the state of Tennessee, have had a significant impact on drug seeking behavior. While this impact may not have affected the number of drug seeking patients, it has begun to slowly limit the amount of patients who are able to successfully obtain multiple narcotic prescriptions from different prescribers. Participants indicated areas of concern regarding this new mandated PDMP in the state of Tennessee during the year of this study as:

- Not all states currently utilize PDMPs to deter drug seeking patients
- Patients can still obtain multiple narcotic prescriptions if they visit a prescriber in an

alternate state which does not utilize PDMPs

- Some physicians provide patients narcotics without a prescription in exchange for cash to avoid adhering to the mandated records kept by controlled substance database

14. Responses once again largely focused on the availability of mental health and addiction treatment resources. Other concerns included:

- Lengthy wait times for entry into inpatient rehab facilities after initial detox, which can result in continuous cycles of relapses by patients
- Waiting periods for entry into rehab facilities for patients with insurance who do not require detox, also experience frequent relapses
- Possibility that bureaucratic concerns over HIPAA protection will prevent mental health and addiction treatment professionals from utilizing emerging electronic tele-health portals

15. Taking into account the totality of participant analysis of the preceding questions; as the final survey question, the researcher encouraged participants to use their experiences and viewpoints of mental health, addiction treatment, and mobile technology, to brainstorm ways in which they believe mobile access to PHI can improve the effectiveness of treatment. Though patients and providers both see the benefits of mobile access to PHI, they have difficulty determining its useful application in mental health and addiction treatment. Both the positive and negative conclusions reached by participants included:

Pros:

- All participants agree that mobile access to PHI portals have proven to be beneficial with their current patient population, observed in the form of higher rates of compliance with prescribed medication regimens, and adherence to scheduled

appointments via text reminders sent to mobile devices

- Patients have access to lab results, x-rays, diagnostic test results, medication history, appointment history, billing information

Cons:

Participant experiences lead them to the determination that patients are not always honest with themselves or therapists/counselors, bringing into question the potential propensity of patient use, and overall effectiveness of mobile or other electronic access to PHI portals for patients receiving mental health and/or addiction treatment

Chapter 5

Conclusions and Recommendations

Summary of Findings

Qualitative analysis indicated that responses were highly influenced by the negative personal and professional experiences of participants, which was the intent of the researcher when designing the study, in efforts to identify areas where future HIM professionals could focus much needed attention and resources. It was apparent that responses were largely geared towards the frustrations of medical and law enforcement professionals regarding the current availability and effectiveness of mental health and addiction treatment resources. 100% of participants expressed favorable viewpoints of the positive impacts of HIM in the quality of medical care, however there was notable apprehension and skepticism as to the potential positive impact of increased HIM integration into mental health and addiction treatment services, without first addressing the larger issues such as the insufficient number of treatment facilities, manpower, and funding.

33% of participants noted prior knowledge or experience with HIM-assisted drug monitoring programs designed to use accountability measures in promoting ongoing sobriety. Of these participants, it was unanimously agreed that if similar accountability-based HIM drug monitoring programs were available at little to cost to the general public, a significant positive impact on helping recovering addicts maintain sobriety would be possible. However, to ensure proper adherence, this accountability must be accompanied by some form of punitive measures when noncompliance occurs. As these measures currently stand with professionals who voluntarily pay out of pocket expenses to participate with HIM-based drug and alcohol monitoring programs, noncompliance can result in job termination and revocation of professional

licensure. Should individuals who are not in jeopardy of losing professional licensure due to noncompliance participate in HIM-based drug monitoring programs, potential alternative accountability measures could be: loss of child custody, welfare benefits, social security, disability income, and job termination when employed in a position that is not dependent on professional licensure.

Consequently, when punitive actions are taken due to noncompliance with HIM-based monitoring programs occurs, this can result in upending the potential for recovering addicts to quickly regain sobriety as punitive measures often result in dramatic negative life changes, such as loss of income and subsequent inability to pay for the mental health and addiction treatment services needed to regain sobriety.

Conclusions

The results of this study clearly represent a strong correlation to findings in similar studies where it was determined that medical professionals see a disturbing rise in substance abuse and addiction as a result of over prescribing highly addictive medicines without providing proper patient education as to the dangers of addiction. Prescribers now see great benefit in using HIM tools such as PDMPs to prevent and identify addiction among patients. However, HIM tools such as PDMPs are largely perceived in the medical community as being an afterthought approach to address the silently growing number of individuals requiring mental health and addiction treatment. Both law enforcement and medical professionals envision the role of HIM in mental health and addiction treatment as being an essential tool with emerging EHR and PHI portals, though the current insufficient amount of resources within this scope of patient care will limit the efficacy of future HIM integration.

Implications of Study

At the time of this study, HIM professionals are in increasing demand to improve the care delivery system primarily for medical care only. This study aims to assess the current state of HIM application in mental health and addiction treatment, and the perceptions of its overall merit from currently practicing medical and law enforcement professionals who frequently encounter substance abuse and addiction among members of the general public. Topics and information covered in this study will help to serve future HIM professionals in raising awareness of the need for, and efficacy of practical HIM application within the mental healthcare and addiction treatment system.

Recommendations

The sample size for this study was not large in scope, and therefore cannot be positively determined to be representative of the views held by a majority of medial and law enforcement professionals. However, this study does provide some insight as to the possible broad scope of concerns regarding mental health and addiction treatment, and the possible contributions that could be made by improved HIM integration and application. Additional studies in the application, availability, as cost effectiveness of innovative HIM integration into mental health and addiction treatment are needed.

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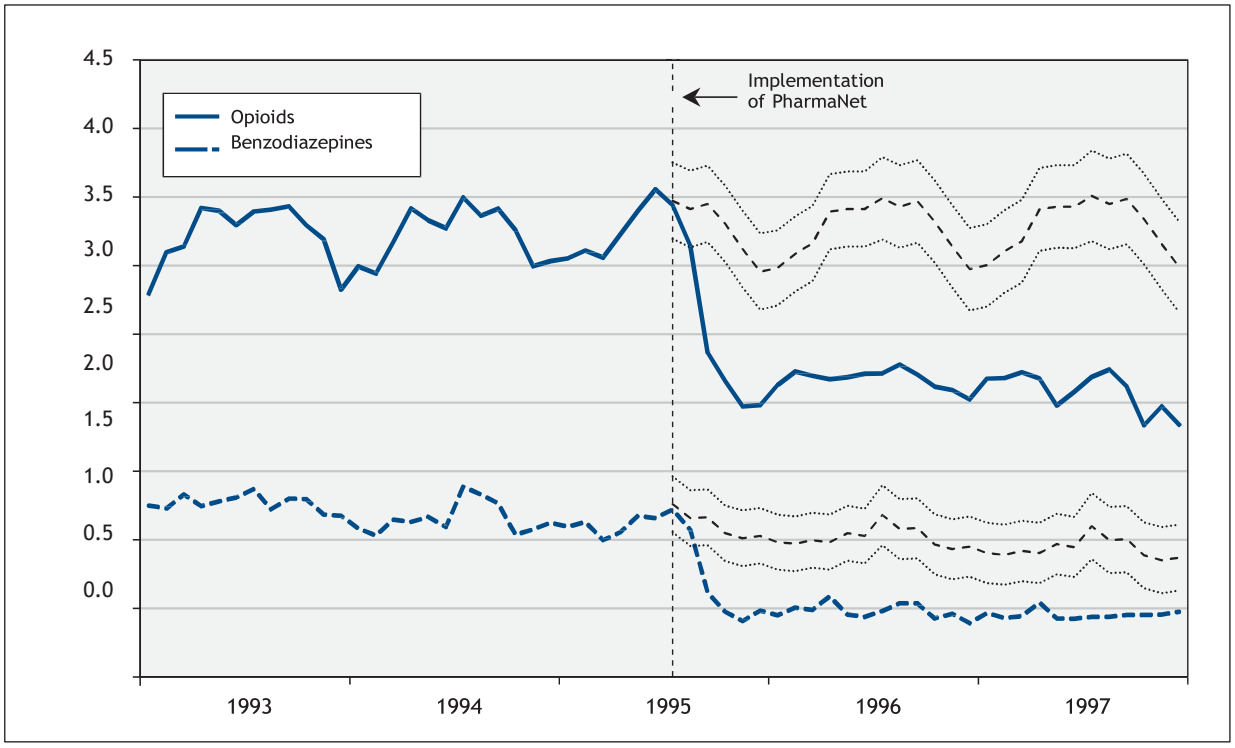
Appendix

Figure 1: Monthly percentages of filled prescriptions for opioid analgesics and benzodiazepines deemed inappropriate among residents of British Columbia receiving social assistance before and after the implementation of PharmaNet, a centralized prescription network. The dashed and dotted lines shown after the implementation of PharmaNet represent the predicted percentages and their 95% confidence intervals had the system not been implemented. (The method for calculating the overall change in inappropriate filled prescriptions during the 30-month period following implementation of the prescription network is described in the Methods section.)



Source: Dormuth, C. R., Miller, T. A., Huang, A., Mamdani, M. M., & Juurlink, D. N. (2012). *Effect of a centralized prescription network on inappropriate prescriptions for opioid analgesics and benzodiazepines.* CMAJ : Canadian Medical Association Journal, 184(16), E852–E856. doi.org/10.1503/cmaj.120465

Table 1: Potential benefits, unintended consequences and tensions around PDMP

Pros	Cons
▪Help avoiding awkward patient confrontation such as urine drug screening, and promote a more patient-centered approach to quality use of opioids. ▪Help monitor and detect forged prescription or stolen prescription pad/page. ▪Help reducing fraudulent prescribing and inform the professional licensing boards about inappropriate prescribing/dispensing. ▪May reveal changes in prescribing practices and patterns, and spatial information in small geographical area may inform tailored intervention. ▪Informed and safe prescribing for patients. ▪An appropriately programed real-time PDMP is likely to reduce prescription drug diversion, doctor shopping, and related casualties. ▪Reduction of overprescribing by the physicians ▪Reduced risk of complications from polypharmacy.	PDMP-induced reduction of prescription opioids may increase crime particularly among illicit drug users, and push some pain patients into the illicit market. ▪Fear among the physicians of being categorized as fraudulent prescribers when they are actually prescribing in good faith but lack training. ▪Privacy concern and data security. ▪Patient may not receive sufficient medications due to physicians' fear of legal retribution ("chilling effect"). ▪Chilling effect may influence increased prescribing of inappropriate or inadequate alternate medications (substitution effect). ▪May deter legitimate prescribing by creating confusion between the concepts of addiction and pseudo-addiction ▪May negatively impact on service rapport and trust

Source: Islam, M. M., & McRae, I. S. (2014). *An inevitable wave of prescription drug monitoring programs in the context of prescription opioids: pros, cons and tensions.* BMC Pharmacology & Toxicology, 15, 46. doi.org/10.1186/2050-6511-15-46