

Prescription Diacetylmorphine Hydrochloride Injections: A Form of Harm Reduction for Chronic Heroin Addicts

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Abstract

Heroin use and addiction is a major problem both internationally and nationally. It is estimated that 13.5 million people in the world take opioids, including 9.2 million who use heroin. In the United States, more people died of drug overdoses in 2014 than in any other year on record. The majority of these drug overdoses (more than six out of ten) involved an opioid. Since 1999, the rate of overdose deaths involving opioids (including prescription opioid pain relievers and heroin) nearly quadrupled. From 2000 to 2014 nearly half a million people died from drug overdoses. 125 Americans die every day from an opioid overdose. A range of treatment options exist for heroin addiction, including medications and behavioral therapies. Treatment usually begins with medically assisted detoxification to help patients withdraw from the drug safely. Medications such as methadone, clonidine, and buprenorphine can be used to help minimize symptoms of withdrawal. The most effective treatment is behavioral treatment in combination with medication, which is usually delivered in residential or outpatient settings. These treatment options are effective for many heroin abusers; however, there is a subset of chronic heroin addicts who do not respond to the standard treatment options including the methadone treatment option. For this subset of chronic heroin addicts supervised injectable diacetylmorphine is being tested and the results are very effective. The problem is in the United States heroin is a Schedule 1 drug, which means it has no accepted medical use. This paper will explore the use of injectable diacetylmorphine medically and ethically as a harm reduction technique and render practical recommendations for its use.

INTRODUCTION

Heroin use and addiction is a major problem both internationally and nationally. It is estimated that 13.5 million people in the world take opioids, including 9.2 million who use heroin.[1] In the United States, more people died of drug overdoses in 2014 than in any other year on record. The majority of these drug overdoses (more than six out of ten) involved an opioid. Since 1999, the rate of overdose deaths involving opioids (including prescription opioid pain relievers and heroin) nearly quadrupled. From 2000 to 2014 nearly half a million people died from drug overdoses. 125 Americans die every day from an opioid overdose.[2] In addition, heroin use, particularly in those who inject the drug, is also responsible for spreading needle-related infectious diseases such as Hepatitis B, Hepatitis C, Human Immunodeficiency Virus (HIV) as well as bacterial infections.[3] Heroin abuse is becoming a problem of epic proportion throughout the United States. According to the 2013 National Drug Threat Assessment Summary, “Heroin-related overdoses and overdose deaths are increasing in

certain areas.”[4] This increase in the number of heroin-related overdoses and overdose deaths can be explained by a number of reasons. First, high-purity heroin has become more readily available to heroin abusers. Second, prescription drug abusers are increasingly switching from abusing prescription drugs to abusing heroin and are more susceptible to overdosing due to their inexperience with using heroin and the varying purity of heroin. These abusers are known to use whichever drug is cheapest or easiest to obtain at that time, which is especially alarming because many of these drug users will ultimately convert to solely abusing heroin due to its addictive nature. Last, according to national data the number of new heroin users in the United States nearly doubled between 2002 and 2011 to 178,000 new users in 2011, while the average age of heroin users has steadily decreased.[5] As more and more people are introduced to heroin at a younger age, the number of overdose related deaths will only continue to increase. Between 2003 and 2013, the rate of heroin-related overdose deaths nearly quadrupled, and more than 8,200 people died

in 2013.[6] This issue has been further escalated by a marked increase in the amount of heroin crossing the southwest border of the United States. This increase in heroin distribution into the United States is so large that the annual amount of heroin seized crossing the southwest border of the United States increased by 232% from 2008 to 2012.[7] Clearly, the availability of heroin is not likely to decrease any time soon. Equally apparent is the need to find a way to decrease the number of heroin-related overdose deaths. Heroin use not only costs lives, it costs society serious amounts of money! It is estimated that heroin use costs the United States about \$5 billion in medical care costs, \$11.5 billion in lost productivity, \$5.2 billion due to crime, and \$0.1 billion from incurred social welfare.[8]

Heroin, also known as diacetylmorphine, is a synthetic opioid drug made from morphine, which is extracted from the Asian opium poppy plant. The drug most often appears in the form of white or brown powder or as a black, tar-like substance known as “black tar heroin” and can cost anywhere from ten to twenty-five dollars on the street.[9],[10] As with other opioids, heroin is used as both a painkiller and a recreational drug and has a high potential for abuse. Heroin is typically injected but is also smoked or snorted. When individuals inject heroin, they are at risk of serious, long-term viral infections such as HIV, Hepatitis C and Hepatitis B, as well as bacterial infections of the skin, bloodstream and heart. A range of treatment options exist for heroin addiction, including medications and behavioral therapies. Treatment usually begins with medically assisted detoxification to help patients withdraw from the drug safely. Medications such as methadone, clonidine, and buprenorphine can be used to help minimize symptoms of withdrawal. The most effective treatment is behavioral treatment in combination with medication, which is usually delivered in residential or outpatient settings.[11] Similarly, another drug, naloxone, is now available to help prevent deaths from heroin-related overdoses. Naloxone is an opioid antagonist that acts on the central nervous system to counteract the effects of an opioid overdose. This allows naloxone to reverse respiratory depression; the main cause of heroin overdose deaths, within five minutes.[12] The drug can be administered via injection into the muscle or in the form of a nasal spray. The Food and Drug Administration (FDA) has recently approved a naloxone auto-injector, Evzio. Evzio is a single-use, credit card-sized prefilled naloxone auto-injector. This device comes with both visual and voice instructions that allow for easy administration of

the drug by laypeople. It also includes a trainer device that can be used to practice how to properly administer the drug.[13] These treatment options are effective for many heroin addicts; however, there is a subset of chronic heroin addicts who do not respond to the standard treatment options including the methadone treatment option. For this subset of chronic heroin addicts additional treatment options must be initiated not only for the good of the heroin addicts but for the good of society as a whole.

One new treatment initiative being utilized in Canada is supervised injectable diacetylmorphine. Chronic heroin addict in Vancouver, British Columbia receive three daily doses of prescription diacetylmorphine hydrochloride, the active ingredient in heroin, at the Crosstown Clinic as a form of treatment known as heroin maintenance. This new method of heroin treatment for addicts is quite controversial in the fight to overcome the heroin epidemic in North America. Crosstown Clinic is the only medical facility in North America permitted to prescribe the narcotic. Proponents of this program argue that this is a lifesaving treatment that has broad societal implications. “Prescription programs like Crosstown’s, for addicts whom replacement drugs like methadone do not seem to help, have been available for years in Britain, Denmark, Germany, the Netherlands and Switzerland. All these countries have reported significant decreases in drug abuse, crime and disease.”[14] This option is only for a subset of heroin addicts who are chronic heroin abusers. The criteria to enter the program is that the patient must have participated in two earlier clinical trials on heroin maintenance, whose eligibility requirements include more than five years of injecting opioids and at least two failed attempts at replacement therapy, one of which with a treatment such as methadone.[15] Critics, like Canada’s Health Minister and members of the Conservative Party in Canada in 2013, sought to establish regulations that would ban the prescription of heroin and other illegal drugs outside of a clinical trial, reflecting the party’s broad opposition to harm-reduction policies. Five Crosstown patients and the Providence Health Care Society, which runs the clinic, filed a case with the Supreme Court of British Columbia to block this move, arguing the federal regulations violated the constitutional right to lifesaving treatment. A Supreme Court justice granted an injunction in 2014 that allowed current patients to continue receiving prescription heroin until the constitutional challenge can be heard in October 2016.[16] This medical and legal dilemma focuses on whether new forms of harm-reduction techniques should be initiated to

help save countless lives. Statistics show that there has been an increase in heroin addictions and deaths in North America. Obviously, the current methods of treatment and incarceration have been unsuccessful in fighting this epidemic. In the best interest of heroin addicts, their families and society as a whole, it appears that new methods of treatment need to be initiated immediately.

The purpose of this article is fourfold. First, this article will put forth a medical analysis of the use of prescription injectable diacetylmorphine hydrochloride as a harm-reduction technique. Second, the arguments both for and against such use of prescription injectable diacetylmorphine will be examined. Third, this article will provide an ethical analysis of the use of prescription injectable diacetylmorphine as a form of treatment for heroin addicts and a form of treatment that can lessen the negative consequences of heroin use. Lastly, this article will propose practical recommendations to address the heroin epidemic.

MEDICAL ANALYSIS

Heroin use is a serious problem largely due to the effects the drug imparts on the user's body in a short period of time. There are a number of ways to use heroin, each of which quickly delivers the drug to the brain. However, the main methods employed by heroin users are injection into a vein or muscle, smoking, or snorting. Intravenous administration of the drug allows it to act on the individual in less than two minutes, while subcutaneous and intramuscular administrations take slightly longer to cause an action.[17] Users of heroin feel an initial euphoric rush and impaired mental functioning, before entering an alternately wakeful and drowsy state known as "going on the nod." [18] "When heroin enters the brain, it is converted back into morphine, which binds to molecules on cells known as opioid receptors. These receptors are located in many areas of the brain (and in the body), especially those involved in perception of pain and in reward. Opioid receptors are also located in the brain stem, which controls automatic processes critical for life, such as blood pressure, arousal and respiration. Heroin overdoses frequently involve a suppression of breathing. This can affect the amount of oxygen that reaches the brain, a condition called hypoxia. Hypoxia can have short-and long-term psychological and neurological effects, including coma and permanent brain damage." [19] Heroin acts as a pro-drug that allows rapid and complete central nervous system absorption; this accounts for the drug's euphoric and toxic effects.[20]

While the drug produces euphoric effects in the short-term, long-term heroin use has serious consequences for the user's health. Chronic abusers of heroin often suffer from "collapsed veins, infection of the heart lining and valves, abscesses, cellulites, and liver disease." [21] Regular heroin users develop a tolerance in which the user's physiological and psychological response to the drug decreases, and additional heroin is needed to achieve the same intensity of effect. Heroin users are at a high risk for addiction. In fact, it is estimated that about 23% of individuals who use heroin become dependent on it.[22] This physical dependence means the user will experience severe withdrawal symptoms, such as drug cravings, insomnia, and vomiting, when his or her heroin usage is decreased or stopped altogether. Some users become so dependent on the drug that these withdrawal symptoms can even become fatal.[23] The overall poor health of a heroin abuser and the depressive effects of heroin on the respiratory system may also result in pulmonary complications, such as pneumonia. Furthermore, some additives that will not completely dissolve in the blood stream may be present in the heroin dosage, leading to clogging of the blood vessels that supply vital organs.[24] These blockages can lead to infection or death of cells in these vital organs.

As mentioned above, heroin is an opioid. Opioids act at three G-protein coupled receptor subtypes, Mu, Kappa, and Delta. The ligands that bind these receptors "are encoded by three different genes and are expressed heterogeneously throughout the CNS and in peripheral tissues." [25] These ligands are distributed similarly to opioid receptors. Agonists that act at these three receptors sites cause analgesia, agonists acting at Mu or Delta receptors cause respiratory depression. Heroin, which is converted into morphine in the body, acts as an agonist at Mu Opioid receptors and can therefore result in respiratory depression. [26] To understand how heroin can result in respiratory depression, we must first understand the processes of respiration. Respiration is carried out to control the levels of oxygen and carbon dioxide in the body through inspiration of oxygen and exhalation of carbon dioxide. Respiration is dependent on external neuronal input from the CNS to the lungs and associated musculature. Breathing is largely controlled in the brainstem via two major neuron groups located in the medulla region, the dorsal respiratory group (DRG) and the ventral respiratory group (VRG). It is believed that the DRG plays a more controlling role and influences the VRG, while the VRG most likely deals with

influencing motor output. This is supported by the fact that “efferent fibres emanating from the VRG innervate the muscles of respiration.”[27] This rhythm of inspiration and exhalation requires activation and inhibition. Excitation is carried out via amino acid receptors, while GABA receptors facilitate inhibition. However, other neurotransmitters, such as serotonin and opioid peptides, may also affect this rhythmic process. Heroin disrupts this process, causing respiratory depression, by acting at the opioid receptors and decreasing neuronal activity. It also diminishes the system’s capacity to sense changes in oxygen and carbon dioxide levels and bring these concentrations to optimum levels, which, as mentioned above, is the main function of respiration.[28]

The history of heroin use is quite interesting from a medical, legal and social perspective. The heroin compound was discovered by an English chemist C. R. Wright in 1874 when as a researcher he was attempting to develop a pain-killer, which was a powerful as and less addictive than morphine. He combined the opiate with acetic anhydride, which produced the powerful acetylated morphine, diacetylmorphine. It was manufactured by Bayer Pharmaceutical eighteen years later, after they independently re-synthesized morphine, without knowing that Wright had written off its potential years before, and it gained widespread acceptance by the medical profession in its early uses as a substitute for morphine, a cough suppressant and a help for “women’s problems.” Surprisingly, Bayer did not have the scientific evidence to realize that heroin is rapidly metabolized into morphine by the liver, and as such acts as a much quicker acting form. Sales increased as time progressed and by 1913 heroin was available to users in capsules, pastilles, diluted in liquids, as a powder, or in the injectable form. Throughout the 1900s reports began about the addictive nature of heroin and patients developing a tolerance to the drug. In 1914, the United States government passed the Harrison Narcotics Tax Act to control sale and distribution of opiates, and made them illegal to use without a prescription. In 1924, the United States Congress banned the sale, importation and manufacture of heroin. In 1970 Congress passed the Controlled Substance Act and the legislation, signed by President Richard Nixon, created five schedule or classifications of drugs with varying qualifications for a substance to be included in each schedule. Two federal agencies, the Food and Drug Administration (FDA) and the Drug Enforcement Administration (DEA) were given the authority to determine

which substances are added or removed from the various schedules. Today heroin is classified as a Schedule 1 drug, which means it has no acceptable medical use in the United States.[29]

There are several treatment options for heroin addiction. These treatment options can be effective when they are combined with a medication compliance program and behavioral therapy. Methadone (Dolophine Methadose), buprenorphine (Subutex, brand discontinued in the U.S.), buprenorphine combined with naloxone (Suboxone) and naltrexone (Depade, ReVia) are approved in the United States to treat opioid dependence. These treatments work by binding fully or partially to opiate receptors in the brain and work as agonists, antagonists or a combination of the two. Agonists mimic the action of the opiate, and antagonists block and reverse the action of the opiate. Oral administration of these drugs may allow for a more gradual withdrawal from opiates. A long-acting intramuscular depot formulation of naltrexone (Vivitrol) is also available for use following opiate detoxification.[30]

Oral maintenance treatment, such as methadone hydrochloride and buprenorphine hydrochloride, has been shown to be effective for many heroin addicts. “However, in contexts where oral maintenance treatment is available, an important minority of individuals with severe opioid use disorders are not attracted into or retained in such treatments, so that alternative approaches are urgently required.”[31] One such alternative for severe or chronic heroin addicts is injectable diacetylmorphine. Two clinical research studies proved the effectiveness of injectable diacetylmorphine for chronic heroin addicts. The first was The North American Opiate Medication Imitative (NAOMI), which was an open-label, phase 3, randomized controlled trial conducted in Montreal, Quebec, and Vancouver, British Columbia from 2005-2008 to determine if injectable diacetylmorphine can be an effective adjunctive treatment from chronic, relapsing opioid dependence. This study found that injectable diacetylmorphine was more effective than oral methadone. Those on diacetylmorphine achieved a higher rate of retention than those on methadone maintenance therapy: 88% and 54% respectively. The amount spent on drugs both decreased by almost half. In fact, participants once spending an average \$1200 USD per month on drugs reported spending between \$320-\$400 USD per month by the end of the treatment phase. During the study the diacetylmorphine group improved significantly in six of the seven remaining

evaluated areas: medical and psychiatric status, employment satisfaction, and family and social relations. Prescribing injectable diacetylmorphine could save an average of \$40,000 in lifetime societal costs per person compared with methadone treatment.[32] The second research clinical trial called The Study to Assess Longer-term Opioid Medication Effectiveness (SALOME) led by principal investigator Dr. Eugenia Oviedo-Joekes involved 202 participants in Vancouver who participated in a six-month double blind study to receive either injectable hydromorphone or injectable diacetylmorphine. The study participants were under the supervision of an interdisciplinary team of physicians, nurses, social workers and counselors. The key findings include:

1. Injectable hydromorphone is as effective as injectable diacetylmorphine for long-term street opioid users not currently benefitting from available treatments (estimated to be about 10% of the opioid dependent population not currently in treatment).
2. Study participants on both medications reported fewer days of street-heroin and other opioid use at six months (three to five days per month), compared to almost daily illicit opioid use prior to being enrolled in the study.
3. Participants also reported a significant reduction in days of illegal activities (from an average of 14.1 days per month to less than four).
4. Almost 80% were retained in treatment for six months
5. Hydromorphone and diacetylmorphine are both safe when taken in a clinical setting. Out of a total of 88,451 injections, there were 14 overdoses and 11 seizures, all successfully managed in the clinic. If these events had occurred in the street, the outcomes may have been fatal.[33]

The main point of this study, published in JAMA Psychiatry in 2016, is that injectable hydromorphone hydrochloride was not worse than diacetylmorphine hydrochloride (pharmaceutical heroin) to treat long-term serve opioid dependence and that could provide alternative treatment for patients where diacetylmorphine is unavailable because of political or regulatory reasons or for patients in whom it was unsuccessful.[34] The problem is that diacetylmorphine is not available in many countries because of political or regulatory reasons. It is not available in the United States because it is a Schedule 1 drug. Hydromorphone has the advantage that it is a legal and licensed pain medication. However, as the SALOME study shows it is not effective for severe heroin addicts. Diacetylmorphine is used in Germany, the Netherlands, Switzerland and Denmark for severe dependencies. It is important to note that internationally, six randomized clinical trials have shown that treatment with

supervised diacetylmorphine is more clinically effective and more cost-effective than oral methadone for the subgroup of severely addicted patients.[35] These well-designed and researched clinical studies provide an alternative that is good evidence based medicine. As a result, in countries like the United States where heroin is an epidemic, injectable diacetylmorphine should be made available for chronic heroin addicts under strict clinical supervision. Like the needle exchange programs that have been effective in decreasing HIV infections among IV-drug users, this new form of treatment can be justified as a harm reduction technique.

DIACETYLMORPHINE AS A HARM REDUCTION TECHNIQUE

The driving force behind the push for injectable diacetylmorphine to be made available as a viable option for chronic heroin addicts is the drug's potential to be used as a harm reduction technique. Harm reduction is an approach focused on minimizing the negative results that go hand-in-hand with drug abuse.[36] Harm reduction techniques have both a medical and ethical impact on the individual and society as a whole. Harm reduction techniques accept the individuals as they are, while also tailoring that person's treatment to fit his or her needs.[37] Furthermore, there are certain principles that are quintessential to an understanding of harm reduction, as listed by the Harm Reduction Coalition:

- Accepts, for better and or worse, that licit and illicit drug use is part of our world and chooses to work to minimize its harmful effects rather than simply ignore or condemn them.
- Understands drug use as a complex, multi-faceted phenomenon that encompasses a continuum of behaviors from severe abuse to total abstinence, and acknowledges that some ways of using drugs are clearly safer than others.
- Establishes quality of individual and community life and well-being—not necessarily cessation of all drug use—as the criteria for successful interventions and policies.
- Calls for the non-judgmental, non-coercive provision of services and resources to people who use drugs and the communities in which they live in order to assist them in reducing attendant harm.
- Ensures that drug users and those with a history of drug use routinely have a real voice in the creation of programs and policies designed to serve them.
- Affirms drugs users themselves as the primary agents of reducing the harms of their drug use, and seeks to empower users to share information and support each other in strategies which meet their actual conditions of use.
- Recognizes that the realities of poverty, class, racism, social isolation, past trauma, sex-based

discrimination and other social inequalities affect both people's vulnerability to and capacity for effectively dealing with drug-related harm.

- Does not attempt to minimize or ignore the real and tragic harm and danger associated with licit and illicit drug use. [38]

Injectable diacetylmorphine's ability to treat chronic heroin addicts who do not respond to standard treatments gives it the potential to be used as a harm reduction agent in and of itself as it can save lives. Furthermore, many individuals who die from opiate overdoses like heroin did not receive necessary medical treatment in time to save them; allowing chronic heroin addicts access to injectable diacetylmorphine could possibly save many preventable deaths. If we as a society value human life as sacred, we must find a way to prevent these deaths. Injectable diacetylmorphine prescription programs, like those in Vancouver, supervised by trained medical personnel as a harm reduction agent could present a viable alternative form of treatment to address the growing heroin addiction epidemic and save thousands of lives.

The heroin epidemic is growing, fatal overdoses are increasing and people are becoming more and more frustrated by legal and political barriers to new forms of treatment being put in place to stop this problem. Injectable diacetylmorphine has been shown to decrease heroin abuse, decrease crime and decrease disease in Canada and Europe. Other new ideas like Vancouver's first legal injection facility InSite currently serves approximately 800 people each day. The addicts bring their own drugs, and InSite provides clean needles and medical supervision. The organization has recorded no fatal overdoses on its premises, and stated that overdoses near the facility have decreased by 35% since 2003, compared with a 9% decrease throughout Vancouver. A study by the British Columbia Center for Excellence in HIV/AIDS found that people who use safe injection sites are 30% more likely to enter detox programs and 70% less likely to share needles.[39] New initiatives like InSite and supervised injectable diacetylmorphine centers like Vancouver's Crossroads Clinic have been rejected in the United States where overdoses have led to 125 deaths a day. This number is unacceptable by any standards.

However, there are criticisms of both the harm reduction approach and the use of injectable diacetylmorphine as a harm reduction agent. First, many argue that the use of a harm reduction technique like injectable diacetylmorphine only encourages people to continue their destructive action. In the case of injectable diacetylmorphine, critics believe its

use will only lead drug abusers reusing heroin in even more dangerous ways. Similarly, critics argue these approaches lead people away from seeking treatment since they now have a safety net of sorts for their risky behaviors. Some critics also believe that we would be wasting valuable money on treating these criminals, when that money could be spent helping more highly contributing members of society. The publically funded program at Crossroads in Vancouver costs about 27,000 Canadian dollars, or \$21,000 per addict per year. Yet the Journal of the Canadian Medical Association published a study in 2012 that estimated that an untreated, severe opioid user costs taxpayers at least \$35,000 a year in medical care, jail and other expenses.[40] Lastly, to strengthen the arguments for this harm reduction approach, it must be determined whether or not broader access to injectable diacetylmorphine would promote more good than harm, not only for heroin users but also for their associates and communities at large.

ETHICAL ANALYSIS

Society, in general, has always recognized that in our complex world there are times when we are faced with situations that have two consequences--one good and the other evil. The time-honored ethical principle that has been applied in these situations is called the principle of double effect. As the name itself implies, the human action has two distinct effects. One effect is intended and good; the other is unintended and harmful. As an ethical principle, it was never intended to be an inflexible rule or a mathematical formula, but rather it is to be used as an efficient guide to prudent moral judgment in solving difficult moral dilemmas.[41] This principle focuses on the agent in terms of intentions and accountability, not just contingent consequences. The principle of double effect specifies four conditions, which must be fulfilled for an action with both a good and a harmful effect to be ethically justified:

- 1) The action, considered by itself and independently of its effects, must not be morally harmful. The object of the action must be good or indifferent.
- 2) The harmful effect must not be the means of producing the good effect.
- 3) The harmful effect is sincerely not intended, but merely tolerated.
- 4) There must be a proportionate reason for performing the action, in spite of the harmful consequence.[42]

The principle of double effect is applicable to the issue of injectable diacetylmorphine because it has two effects, one good and the other harmful. The good effect is that this drug has the potential to save lives and hopefully encourage the heroin user to seek rehabilitation. The harmful effect is that some believe that it may send a wrong message that illegal drug use is condoned and even encouraged. This could lead to scandal. To determine if injectable diacetylmorphine is ethical, this issue will be examined in light of the four conditions of the principle of double effect.

The first condition allows for injectable diacetylmorphine because the object of the action, in and of itself, is good. The moral object is the precise good that is freely willed in this action. The moral object of this action is to save lives by providing an effective and alternative treatment for chronic addicted heroin addicts and hopefully getting these individuals into drug rehabilitation. The immediate goal is not to endorse illegal drug use or to encourage it. Rather, the direct goal is to offer an effective alternative treatment for chronic heroin addicts who meet the criteria for the program, in order to help the individual addict and to decrease drug abuse, crime and disease. A participant in the Crossroad's program in Vancouver states: "Diacetylmorphine has opened up a path back to normalcy. He compared it to the insulin injected daily by diabetics: just a drug he needs to stay alive." [43]

The second condition permits making injectable diacetylmorphine available at supervised sites as an alternative treatment for chronic heroin addicts because the good effect of offering an effective alternative treatment that can save lives is not produced by means of the harmful effect. The two effects are completely independent. Making injectable diacetylmorphine available at approved clinics administered by health care professionals has no intention of encouraging drug abuse. In fact, the opposite is true. To argue that public health officials are encouraging or condoning drug abuse is illogical. This is "like suggesting that air bags and seatbelts encourage unsafe driving." [44]

The third condition is met because the direct intention of making injectable diacetylmorphine available is to protect and preserve human life and to encourage drug rehabilitation, social support, professional counseling and medical care. The direct intention of this program is to preserve the lives of the most vulnerable that is, chronic heroin addicts, by stopping heroin overdoses and indirectly, through rehabilitation decreasing illegal drug use. The

foreseen but unintended consequence of this may be the belief by some that this is condoning and even encouraging illegal drug use. One might also argue that it could give heroin users a "false" sense of security that they can always find a fix. Nevertheless, there is no scientific evidence that proves this will encourage or even increase heroin abuse. In fact research shows that the opposite is true.

Finally, the argument for the ethical justification of making injectable diacetylmorphine available by the principle of double effect focuses on the fourth condition of whether there is a proportionately grave reason for allowing the unintended possibility of scandal and the possibility of increased drug usage. Proportionate reason is the linchpin that holds this complex moral principle together.

Proportionate reason refers to a specific value and its relation to all elements in the action.[45] The specific value in allowing for naloxone is to preserve human life by reversing the effects of heroin overdoses and encouraging drug rehabilitation to the most vulnerable members of society. The harm, which may come about by trying to achieve this value, is the foreseen but unintended possibility that some may view this as condoning and even encouraging illegal drug use. The ethical question is whether the value of preserving human life outweighs the harm of the foreseen, but unintended, possibility of scandal and possible increased drug usage? To determine if a proper relationship exists between the specific value and the other elements of the act, ethicist Richard McCormick, S.J. proposes three criteria for the establishment of proportionate reason:

- 1) The means used will not cause more harm than necessary to achieve the value.
- 2) No less harmful way exists to protect the value.
- 3) The means used to achieve the value will not undermine it.[46]

The application of McCormick's criteria to making injectable diacetylmorphine available as an alternative treatment supports the argument that there is a proportionate reason for allowing this program. First, according to public health officials, the use of injectable diacetylmorphine, as part of a comprehensive drug prevention program, can decrease overdose deaths, drug abuse, crime and disease and could increase heroin addicts to seek drug rehabilitation. The NAOMI and the SALOME clinical research studies both found that injectable diacetylmorphine is effective for the

chronic heroin user. Dr. Suzanne Brissette, head investigator for the NAOMI Study in Montreal states, “Heroin-assisted therapy is a safe and effective treatment for people with chronic heroin addiction. It can attract and retain the most difficult-to-reach and the hardest-to-treat individuals who have not been well served by the existing treatment system.”[47] If making injectable diacetylmorphine readily available for chronic heroin addicts under medical supervision, as part of a comprehensive program, saves lives and does not increase drug usage or condone drug use, then, this program does not cause more harm than necessary. To verify these facts, the program should be initiated on a wide-scale basis in order to collect more data. Larger clinical trials in major cities in the United States would offer valuable data regarding this issue.

Second, at present, there does not appear to be an alternative that is as effective as injectable diacetylmorphine for the chronic heroin addicts. It is true that other means of treatment exist such as oral maintenance treatment, which includes methadone hydrochloride and buprenorphine hydrochloride, but according to research studies in Europe and Canada, injectable diacetylmorphine is most effective for severe opioid use disorder. Medical authorities and public health officials in Germany, the Netherlands, Switzerland and Denmark have shown through six randomized clinical trials that supervised injectable diacetylmorphine is more clinically effective and more cost-effective than oral methadone for the subgroup of severely addicted heroin patients.[48] In the United States public health authorities estimate that 125 people die of heroin overdoses a day. Many of these overdoses are chronic heroin addicts. If injectable diacetylmorphine is effective clinically and other forms of oral maintenance are not as effective, then this program needs to be expanded and the United States needs to re-evaluate heroin as a Schedule 1 drug immediately before more lives are lost.

The critical aspect that cannot be overlooked in making injectable diacetylmorphine readily available at various supervised sites for chronic heroin addicts is the element of human contact. Human contact is with a health care professional who injects the chronic heroin addict with diacetylmorphine three times a day at an approved clinic. This human contact allows health care workers to form personal relationships with the addicts and thus provide the opportunity to offer them appropriate health care, personal counseling and referrals to treatment centers. Various

scientific studies have confirmed that intravenous drug users reduce risk-laden behaviors when pertinent information and services, such as counseling are made available, and especially when they are offered by peers who are members of the drug-using subcultures.[49] The Crossroads Clinic in Vancouver also offers peer counseling to these addicts by recovered heroin addicts. “The human contact of having individuals trained to inject diacetylmorphine communicates a powerful message to addicts that their lives and well-being are still valued by the community, even though they may not yet be able to break the cycle of addictive behavior.”[50] Making injectable diacetylmorphine available to chronic heroin addicts by trained health care professionals not only has the potential to save human lives but also to foster human dignity and respect.

Third, injectable diacetylmorphine does not undermine the value of human life. One can argue convincingly that the intention of making injectable diacetylmorphine available to chronic heroin abusers by trained health care professionals is to save human lives. A program like Crossroads in Vancouver has the potential to decrease drug overdoses and to increase referrals to drug rehabilitation centers. The purpose of making supervised injectable diacetylmorphine available to chronic heroin addicts is to save lives and from the current data it appears to be quite effective. This is a public health issue that must be addressed because innocent lives are being lost. It seems clear that there is a proportionate reason to allow supervised injectable diacetylmorphine to be made available in the United States using taxpayer money. Supervised injectable diacetylmorphine contributes to the well-being of chronic heroin addicts and society as a whole because it has the potential to preserve the lives chronic heroin abusers and has been proven to decrease drug abuse, crime and the spread of diseases like HIV, Hepatitis C and Hepatitis B. It also offers those who are chronic heroin addicts the opportunity to realize that they are valued as persons and that with the appropriate assistance addiction can be overcome. Therefore, it is ethically justified under the principle of double effect to allow for supervised injectable diacetylmorphine to be made available to chronic heroin addicts at certified medical clinics. Ethically, the greater good of addicts and the common good of society are advanced by financially supporting the use of injectable diacetylmorphine in major cities in the United States.

CONCLUSIONS AND RECOMMENDATIONS

Heroin is clearly a life and death issue, as the supply of heroin in our country grows and the addictive nature of the drug causes more and more individuals to become addicted to it. This drug affects thousands of lives and costs society billions of dollars each year. Evidence has shown that supervised injectable diacetylmorphine will be beneficial both at the individual level and the societal level. For the individual, it has been proven to effectively treat chronic heroin addicts who have failed other replacement therapies and to save lives. On a societal level, the use of injectable diacetylmorphine can ultimately decrease the strain on the medical system as more individuals will be educated on the use of heroin, which will lead to heroin users using the drug more safely and, over time, working to break their addictions. Societally, it will also decrease crime by these individuals and hopefully, because the treatment is supervised, it will decrease long-term viral infections such as HIV, Hepatitis C, and Hepatitis B as well as bacterial infections of the skin, bloodstream and heart.

Based on the information provided the following are practical recommendations:

1. The United States federal government should sponsor large open-label, randomized, and controlled trials to compare injectable diacetylmorphine with oral methadone maintenance therapy in patients with heroin dependence that was refractory to treatment. Data obtained should prove conclusively the medical benefit of injectable diacetylmorphine.
2. The Food and Drug Administration and the Drug Enforcement Administration need to re-evaluate the status of medical heroin as a Schedule I drug. If data obtained from U.S. clinical trials proves the effectiveness of injectable diacetylmorphine that has been shown in clinical trials in Europe and Canada, then heroin should be re-evaluated as a Schedule II drug.
3. Public Health Departments need to provide educational training and resources to medical professionals, public health officials, law enforcement officials and the community about the effectiveness of injectable diacetylmorphine for chronic heroin addicts. This education needs to reinforce data about how injectable diacetylmorphine can decrease drug abuse, crime and disease and thus is very cost effective as a therapy. This education would limit the notion of scandal.
4. Public Health Departments need to establish monitoring programs such as electronic databases that will track the dispensing of injectable diacetylmorphine as a routine part of clinical practice.
5. The federal government must increase access to substance abuse treatment services through the

Affordable Care Act and expand use of Medication-Assisted Treatment.

6. The new CDC Guidelines for Prescribing Opioids for Chronic Pain need to be implemented and enforced in the United States health care system. In addition, more funding needs to be appropriated for research and development of new pain medications that have less potential for abuse.

It is clear that supervised injectable diacetylmorphine for chronic heroin addicts can and will save lives. If we as a society value human life, we must continue to increase access to this therapy and work to effectively serve drug abusers in their fight to beat addiction. A comprehensive approach that includes a preventative strategy, a treatment strategy, and a harm reduction strategy could serve as a new paradigm to guide our decisions regarding drug addiction. We cannot allow the appearance of scandal to stand in the way of proven scientific evidence. Human lives are hanging in the balance.

References

1. "International Statistics." DrugFreeWorld. <http://www.drugfreeworld.org/drugfacts/heroin/international-statistics...>
2. Centers for Disease Control and Prevention, "Increases in Drug and Opioid Deaths-United States, 200-2014. MMWR 2015; 64: 1-5. http://www.cdc.gov/mmwr/preview/mmwrhtml/mm64e1218a1.htm?s_cid=mm64e1218a1_e
3. "Heroin Statistics - Facts About Heroin Addiction, Use & Death." Heroin Statistics - Facts About Heroin Addiction, Use & Death - Drug-Free World. N.p., n.d. Web. 21 July 2014. .
4. Drug Enforcement Administration, US Dept. of Justice, and United States of America. "National Drug Threat Assessment 2013 Summary." (2013): 1-7.
5. "National Drug Threat Assessment 2013 Summary." 6.
6. Editor, "Today's Heroin Epidemic," Centers for Disease Control and Prevention (July 7, 2017): 1-6. <http://www.cdc.gov/vitalsigns/heroin/index.html>.
7. "National Drug Threat Assessment 2013 Summary." 5.
8. Mark, Tami L., et al. "The Economic Costs of Heroin Addiction in the United States." Drug and Alcohol Dependence 61.2 (2001): 195-206.
9. National Institute on Drug Abuse: NIDA InfoFacts: Heroin. March 2010: 1-4. <http://www.drugabuse.gov/infofacts/heroin.html>.
10. "How Much Does Heroin Cost?" Heroin.net. N.p., n.d. Web. .
11. "DrugFacts: Heroin." National Institute on Drug Abuse (NIDA). National Institutes of Health, Apr. 2013. Web. 21 July 2014. .
12. "Where to Get Naloxone / FAQs." StopOverdose.org - Where to Get Naloxone / FAQs. N.p., Apr. 2013. Web. 21 June 2014.
13. "Introducing EVZIO, the First and Only Naloxone Auto-injector." The First and Only Naloxone Auto-Injector EVZIO. N.p., July 2014. Web. 17 June 2014.
14. Levin, Dan. "Vancouver Prescriptions for Addicts Gain Attention as Heroin and Opioid Use Rises," New York Times (April 21, 2016).

- <http://www.nytimes.com/2016/04/22/world/americas/canada-vancouver>
15. Levin, 3.
16. Levin, 3.
17. "DrugFacts: Heroin." National Institute on Drug Abuse (NIDA). National Institutes of Health, October 2014. Web. 22 April 2016. .
18. "DrugFacts: Heroin," National Institute on Drug Abuse: 2
19. "DrugFacts: Heroin," National Institute on Drug Abuse: 2.
20. Sporer, K: Acute Heroin Overdose. *Annals of Internal Medicine*; 130, (1999): 584-590.
21. "DrugFacts: Heroin," National Institute on Drug Abuse: 1- 2.
22. "DrugFacts: Heroin," National Institute on Drug Abuse: 1.
23. "DrugFacts: Heroin," National Institute on Drug Abuse: 3.
24. "DrugFacts: Heroin," National Institute on Drug Abuse: 3.
25. White, Jason M., and Rodney J. Irvine. "Mechanisms of Fatal Opioid Overdose." *Addiction* 94.7 (1999): 963.
26. White, Jason M., and Rodney J. Irvine. 963-964.
27. White, Jason M., and Rodney J. Irvine. 962.
28. White, Jason M., and Rodney J. Irvine. 962.
29. The following is the DEA's drug scheduling: Schedule I: Schedule I drugs, substances, or chemicals are defined as drugs with no currently accepted medical use and a high potential for abuse. Schedule I drugs are the most dangerous drugs of all the drug schedules with potentially severe psychological or physical dependence. Some examples of Schedule I drugs are: heroin, lysergic acid diethylamide (LSD), marijuana (cannabis), 3, 4-methylenedioxymethamphetamine (ecstasy), methaqualone, and peyote. Schedule II: Schedule II drugs, substances, or chemicals are defined as drugs with a high potential for abuse, with use potentially leading to severe psychological or physical dependence. These drugs are also considered dangerous. Some examples of Schedule II drugs are: Combination products with less than 15 milligrams of hydrocodone per dosage unit (Vicodin), cocaine, methamphetamine, methadone, hydromorphone (Dilaudid), meperidine (Demerol), oxycodone (OxyContin), fentanyl, Dexedrine, Adderall, and Ritalin. Schedule III: Schedule III drugs, substances, or chemicals are defined as drugs with a moderate to low potential for physical and psychological dependence. Schedule III drugs abuse potential is less than Schedule I and Schedule II drugs but more than Schedule IV. Some examples of Schedule III drugs are: Products containing less than 90 milligrams of codeine per dosage unit (Tylenol with codeine), ketamine, anabolic steroids, testosterone. Schedule IV: Schedule IV drugs, substances, or chemicals are defined as drugs with a low potential for abuse and low risk of dependence. Some examples of Schedule IV drugs are: Xanax, Soma, Darvon, Darvocet, Valium, Ativan, Talwin, Ambien, Tramadol. Schedule V: Schedule V drugs, substances, or chemicals are defined as drugs with lower potential for abuse than Schedule IV and consist of preparations containing limited quantities of certain narcotics. Schedule V drugs are generally used for antidiarrheal, antitussive, and analgesic purposes. Some examples of Schedule V drugs are: cough preparations with less than 200 milligrams of codeine or per 100 milliliters (Robitussin AC), Lomotil, Motofen, Lyrica, Parepectolin. Drug Enforcement Administration, "Drug Scheduling," *Drug Information*, (2015): 1.
- <http://www.dea.gov/druginfo/ds.shtml>
30. Editor, "Heroin," *Drugs.com* (5/18/2014): 1-4. <https://www.drugs.com/illicit/heroin.html>
31. Editor, "Injectable Drug Shows Promise for Severe Opioid Use Disorder," *Psych Congress Network* (2015): 1-3. <http://www.psychcongress.com/article/injectable-drug-shows-promise-for-severe-opioid-use-disorder>.
32. Oviedo-Joekes E., Brisette S., Marsh D. et al. "Diacetylmorphine versus Methadone for the Treatment of Opioid Addiction," *New England Journal of Medicine* 361 (8) (August 20, 2009): 777-786.
33. Editor, "Results of World's First Study on New Treatment for Heroin Addiction," *Science Daily*, 6 April 2016. www.sciencedaily.com/releases/2016/04/160406123938.htm
34. Oviedo-Joekes E., Guh, D., Brisette S, et al. "Hydromorphone Compared With Diacetylmorphine for Long-Term Opioid Dependence," *JAMA Psychiatry*, 2016; DOI:10.1001/jamapsychiatry.2016.01.09
35. Melville, Nancy. "Hydromorphone Shows Benefit for Severe Opioid Dependence," *MedScape*, (April 8, 2016) 1-2. <http://www.medscape.com/viewarticle/861678>. See also, Schechter et al. "Hydromorphone Compared With Diacetylmorphine for Long-Term Opioid Dependence: A Randomized Clinical Trial. *Journal of the American Medical Association*, April 2016 DOI: 10.1001/jamapsychiatry.2016.0109. Marchand et al. "Client Satisfaction Among Participants in a Randomized Trial Comparing Oral Methadone and Injectable Diacetylmorphine For Long-term Opioid Dependence," *BMC Health Services Research*, 2011, 11: 174. <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3161847/>. Metrebian N., Shanahan W., Wells, B., Stimson G. "Feasibility of Prescribing Injectable Heroin and Methadone to Opiate-dependent Drug Users; Associated Health Gains and Harm Reductions," *The Medical Journal of Australia* 168, (12) (June 1998): 596-600. Strang J., Metrebian N., Lintzeris N. et al. "Supervised Injectable Heroin or Injectable Methadone Versus Optimized Oral Methadone as Treatment for Chronic Heroin Addicts in England After Persistent Failure in Orthodox Treatment: A Randomized Trial," *The Lancet* 375, (May 29, 2010).
36. "Principles of Harm Reduction." *Harm Reduction Coalition*. N.p., n.d. Web. 19 June 2014.
37. Marlatt, G. Alan, and Katie Witkiewitz. "Update on Harm-Reduction Policy and Intervention Research." *Annual Review of Clinical Psychology* 6 (2010): 591-606.
38. "Principles of Harm Reduction." *Harm Reduction Coalition*. N.p., n.d. Web. 19 June 2014.
39. Levin, 2.
40. Nosyk B., Guh D., Bansback N. et al. "Cost-Effectiveness of Diacetylmorphine Versus Methadone For Chronic Opioid Dependence Refractory to Treatment," *Canadian Medical Association Journal* 184 (August 3, 2012): E317-E328. Published ahead of print March 12, 2012, doi:10.1503/cmaj.110669.
41. Mangan, J. "An Historical Analysis of the Principle of Double Effect," *Theological Studies*; 10, (1994): 41.
42. Kelly, G. *Medico-Moral Problems* (St. Louis, MO.: The Catholic Health Association of the United States and Canada, 1958): 13-14.
43. Levin, 4.
44. Hoffman, Robert S. "How To Stop Heroin Deaths," *New York Times*, February 6, 2014. <http://www.nytimes.com/2014/02/07/opinion/how-to-stop-heroin-deaths>.

45. Walter, J. "Proportionate Reason And Its Three Levels Of Inquiry: Structuring The Ongoing Debate," *Louvain Studies*, 10 (1984): 32.
46. McCormick's criteria for proportionate reason first appeared in McCormick, R: *Ambiguity In Moral Choice* (Milwaukee, WI.: Marquette University Press, 1973). He later reworked the criteria in response to criticism. His revised criteria can be found in *Doing Evil To Achieve Good*, eds. Richard McCormick and Paul Ramsey (Chicago, IL.: Loyola University Press, 1978).
47. Providence Health System, "Results of North America's First Heroin Study (NAOMI)," Canadian Institutes of Health Research, (2010): 1-2.<http://www.providencehealthcare.org/Salome/naomi-study.html>
48. Melville, 1.
49. American Medical Association's Council On Scientific Affairs: 10. See also, Booth, R. and Wiebel, W. "Effectiveness Of Reducing Needle-Related Risks For HIV Through Indigenous Outreach To Injection Drug Users," *American Journal of Addictions*, 1 (1992): 277-287; Neaigus, A., Sufian, M., Friedman, S.R. et al. "Efforts Of Outreach Intervention On Risk Reduction Among Intravenous Drug Users," *AIDS Education Prevention*, 2 (1990): 253-271; and Watters, J. Downing, M., Case, P. et al. "AIDS Prevention For Intravenous Drug Users In The Community: Street Based Education And Risk Behavior," *American Journal of Community Psychology*, 18 (1990): 587-596.
50. Fuller, J. "Needle Exchange: Saving Lives," *America*; 179 (1998): 9.

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