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INTRODUCTION

Dr. Silverman was heading into a family meeting, and he knew that he was going to be faced with a very difficult situation. The patient in question, known as Mr. W, was extremely ill, had very few resources, no support system, and struggled with drug addiction. The patient had been admitted to the hospital several days earlier because of an infection in his heart, specifically infective endocarditis (IE). The infection, resulting from the patient's drug use, required the administration of intravenous (IV) antibiotics. The patient was deemed ready to be discharged, and hospital management was pushing for immediate discharge. In order for a smooth transition out of the hospital, services were required to allow the patient to receive antibiotics at home. Dr. Silverman knew that the patient had difficulties securing housing and, immediately prior to his hospital admission, Mr. W had been in and out of homelessness. He invited Julian Morrison, the Managing Director at London CAReS, to come to a meeting to discuss Mr. W's housing options. Dr. Silverman was also aware that Mr. W was at the beginning of what could be weeks and months of required care and that a secure home environment was essential. In anticipation of the meeting with the patient, Dr. Silverman had been in close consultation with Dr. Newman, a health researcher studying injection drug users and their related health complications. They previously had the opportunity to discuss different aspects of Mr. W's case, and he hoped that Dr. Newman's insight would help them decide on a suitable course of action today.

Dr. Silverman hoped there would be a better option; one that the health system had not yet considered.

BACKGROUND

Drug-related health complications were particularly pressing and challenging issues for the City of London; estimates indicated that there was a high prevalence of addiction to narcotics among residents in the city, when compared to other jurisdictions (Middlesex-London Health Unit, 2014). Intravenous drug use was on the rise, with narcotics being the most commonly injected drugs, and a higher proportion of injection drug users in London report sharing injection equipment in comparison to national levels (Middlesex-London Health Unit, 2012). In addition to blood-borne viral infections, such as HIV and Hepatitis C and B, injection drug users can also contract bacteria, which can result in infective endocarditis (IE). Left untreated, IE can result in life-threatening complications. Individuals with IE are typically treated with antibiotics administered through IV. Patients receiving IV antibiotics do not typically need to stay in the hospital and are often sent home.

In many jurisdictions, patients with IE are treated through home care; in London, the South West Community Care Access Centre (CCAC) is responsible for delivering home care. As part of the Ministry of Health and Long-Term Care's mandate, the CCAC is to provide equitable and consistent care. While many plans are focused on the needs of the health care provider, the CCAC has made a shift towards making plans more patient and family centered. Accordingly,

the CCAC serves vulnerable homeless population groups differently. The CCAC typically operates through referral requests to help patients receive care in the home. Unfortunately, there is often no mechanism to locate homeless individuals, since referrals from hospitals only include a name, sometimes a health card, but often lack any other contact information. In addressing this problem, the CCAC strives to collaborate with service providers to treat these populations wherever they live, regardless of whether or not they are homeless. Since these patients are medically and socially complex, they require an alternate level of care and need attention when they are unable to be served in hospitals. Together, physicians, the CCAC, and the rest of a patient's care team work to create a care plan that is in the patient's best interest.

When a patient has IE and requires antibiotics through IV, the standard treatment options often considered are:

1. a patient is sent home with a peripherally inserted central catheter (a 'PICC'-line) and administers the antibiotic with the assistance of a CCAC nurse;
2. a patient is hospitalized and receives care and IV antibiotics in the hospital; or,
3. a patient receives no treatment.

Mr. W's care team was perplexed by their options. When given a PICC-line in the first scenario, patients who are known to be intravenous drug users are essentially given a new method for injecting drugs – "a highway for illicit drugs". In addition to the risk a patient may face from injecting drugs through the PICC line, there is danger of developing another infection if the needles used are contaminated (Glauser, Petch & Tierney, 2016). The second standard treatment option intends to avoid these risks. In this scenario, a patient would be hospitalized for four to six weeks at a significant cost to the health care system. In this scenario, the patient and their health care providers often become frustrated. Patients can become disruptive, abusive, noncompliant, and often will choose to leave the hospital against medical advice. Providers are often equally frustrated by patient behaviour and by the reality that a hospital bed is required. In the third standard treatment option, a patient is sent home without proper treatment, and will become sicker and often die.

City of London

London is home to an increasing population of over 365,000 residents. London is the largest city in Southwestern Ontario with land areas of 2,656 square kilometers, which can be divided into Central, North East, North West, South East and South West London (Statistics Canada, 2011). There are numerous social determinants of health associated with drug use, including income, age, sex, education, unemployment, and housing.

In 2011, London's population was 48% male and 52% female. Children ages 0-14 years old comprised 16%, ages 15-25 years old constituted 15%, the working age (25-64 years old) composed 54% of the population, and lastly, seniors ages 65+ constituted 15% of London's population.

London's unemployment rate was at 9%, and the city's top three employment industries were Health Care and Social Assistance (13.8%), Retail Trade (11.7%), and Manufacturing (10.5%) (City of London, 2011a). In 2011, 25% of London residents aged 25 and older had attained a high school diploma or equivalent, which was on par with the 24% of Ontarians who did as well. Sixty-six percent of both the London and the Ontario populations received a post-secondary certificate, diploma, or degree; the most common areas of post-secondary study reported were business, management, and public administration (City of London, 2011b).

Low-income rates in London are higher than rates in Ontario and Canada. In 2006, 11.8% of residents had incomes below the Low-Income Cut Off (LICO), and 14.6% of children and youth lived with families whose income fell below the LICO level. On average, 89% of the 360 emergency shelter beds were used each night in 2009 in London. In 2006, 14% of households were in core housing need, which is defined as households that are unable to afford shelter that meets adequacy, suitability, and affordability norms (City of London, 2011c).

London Health Sciences Centre
The London Health Sciences Centre (LHSC) consists of six multi-site health facilities in London, Ontario. In 2011/2012, there were 153,784 emergency visits, 972 hospital beds, and 14,139 employees providing health care service to the 47,903 patients who were admitted for an average stay of 7.1 days among the sites (London Health Sciences Centre, 2012).

The community strategy at LHSC is based on four aspects: (i) harm reduction, (ii) prescription, (iii) enforcement, and (iv) prevention. Harm reduction strategies related to drug use include physicians informing their patients about the risks and harms of sharing needles, as well as other equipment involved in drug use, such as spoons, cookers or washes.

Supports in the Community: London CAReS
London CAReS has a mandate to end homelessness in London. In 2011, London CAReS shifted from supporting people trying to survive on the streets to a Housing-First approach. The new aim was to assist people experiencing chronic homelessness, the effects of poverty, and persistent concurrent disorders in obtaining immediate access to permanent housing of their choice. London CAReS continues to offer 24/7 street outreach support to connect with individuals experiencing homelessness, who may not be accessing other existing services in a meaningful way. By setting someone up with a home base from which to address complex health issues, London CAReS hopes to break the cycle of homelessness and support individuals in their home which can lead to improved health outcomes.

The London Homeless Coalition
The London Homeless Coalition Memorial Committee monitors how many lives are lost to homelessness, which is a very complex problem. In recent years, there has been an increase in the number of deaths as a result of infective endocarditis, especially in youth.

IV Drug Use Overview: Iatrogenesis
The history of injectable drug use and the prevalence of addiction to narcotics can be linked to the abundance of physicians overprescribing narcotics for pain management during the 1990s and early 2000s. This began with large pharmaceutical corporations who delivered false claims, such as “as long as you’re in pain, you can’t get addicted” and “there is no ceiling on opioids”. As a result of this messaging and relying on the representations from large pharmaceutical companies that there were no adverse effects or potential for addiction, many physicians overprescribed narcotics with dangerous consequence to their patients (Van Zee, 2009). This worsened due to the inability of physicians to manage patients’ behaviours and their lack of knowledge about drug use (Silversides, 2009). An additional complexity is that patients believed that if they used up prescribed dosages of drugs, the smart choice was to obtain alternative drugs off the street, because it avoided waiting for new prescriptions and losing tolerance.

The three most common drugs injected intravenously have been identified as opioids (such as oxycodone, morphine, and codeine), crystal meth, and Ritalin. Opioids and Ritalin are both iatrogenic drugs that the health care system is responsible for providing to the public (National Institute on Drug Abuse, 2016). This meant that the health care system has shared a role in the

current overdose situation, as doctors have overprescribed opioids and Ritalin for pain management.

People Who Inject Drugs (PWID)

The rate of people who inject drugs (PWID) is steadily increasing. There are numerous reasons why people choose to inject drugs as opposed to administering substances through less invasive methods, such as swallowing, snorting, or smoking. These reasons may be related to sociocultural factors or simply related to drug types. The shift in drug consumption methods can be attributed to several factors, including drug dependence, and the belief that injecting drugs provides a more rapid and effective method to obtain desired drug effects (Haber, Day, & Farrell, 2015). Witnessing other individuals injecting drugs and having family or friends who inject drugs are also cited as reasons for choosing injection as the preferred mode of delivery (Haber, Day, & Farrell, 2015).

Currently, the increase in prevalence of PWID has resulted in an overall increase in drug overdoses. As a result, many physicians are placed in a difficult position. Physicians may decide to stop providing analgesic treatment, however, this may result in patients succumbing to an even worse situation. Faced with withdrawal, patients may become involved in “street” activities, crime, and go on to use alternative drugs that are more inexpensive, dangerous, and illegal (Fields, 2011). In contrast, if physicians continue prescribing narcotics after an overdose, they may face risk of litigation from families and affiliated colleges.

IV Drug Use in the City of London

In 2012, a survey of PWID funded by the Public Health Agency of Canada (PHAC) was conducted in Middlesex-London. Of the 204 respondents, 73% were male and 27% were female, with an average age of 36 years old. Fifty-three percent of respondents had less than high school education and 44% of respondents had a monthly income of less than $1000. Fifty-seven percent of respondents had an unstable housing situation and 20% had been incarcerated in the previous six months (Middlesex-London Health Unit, 2012).

The survey also found that in London, 47% of respondents injected alone, males were more likely than females to inject alone, and women were more likely to inject with a regular sex partner. Prescription drugs were the principal drugs used for injection, specifically OxyContin (a type of opioid), which was used by 70% of respondents, and Ritalin, which was used by 60% of respondents (crystal meth was used by 68% of respondents). In terms of injection and risk behaviors, 27% of PWID lent needles to others, and 20% had borrowed needles in the previous six months (Middlesex-London Health Unit, 2012).

Endocarditis

While the potential to overdose poses an evident danger to the lives of PWID, infections are a major cause of death for drug users and are the most severe complication associated with IV drug use. Specifically, bacterial infections are frequently the result of improper preparation and use of prescribed medication. Medication prescribed in tablet form is to be ingested orally to allow stomach acids to kill any bacteria present. When these drugs are taken intravenously, there is a risk of contaminating the drug (e.g., equipment used to heat and prepare the drug is not sterile, or skin is not sterilized before injection). After bacteria enters the body, infection can develop in various organs, including the lungs, bones, joints, brain, spinal cord, and heart.

When the heart is affected, IE can result. Endocarditis is defined as the infection and inflammation of the inner lining of the endocardium of the heart. Right-sided endocarditis is

extremely common in IV drug users, as non-sterile injections into the venous system usually affect the tricuspid valve (Moss & Munt, 2003).

Common complaints of IV drug users with IE are dyspnea, coughing, and chest pain; as well, IV drug users are more likely to develop pneumonia or septic pulmonary emboli (Moss & Munt, 2003).

IE is typically diagnosed using chest x-rays, blood cultures, electrocardiogram, or echocardiographic techniques. The Duke diagnostic criteria are usually used to identify IE as they combine clinical, microbiologic, pathologic, and echocardiographic characteristics. A definitive clinical diagnosis of IE is met if the patient exhibits either two major criteria, one major criterion and three minor criteria, or five minor criteria (Moss & Munt, 2003). (See Exhibit 1 for more information on IE and a list of criteria.)

Generally, treatment for IE includes a high-dose of IV antibiotics that are prescribed for two to eight weeks, dependent on the bacteria and its susceptibility (Huckell, n.d.). Treatment for IV drug users is often more complicated due to the likelihood they will check out of the hospital before treatment is complete or abuse IV access lines. Therefore, a short IV treatment course or oral therapy is usually recommended. In more severe cases, surgery that may include valve replacement or repair may be recommended.

Prognosis for IE mainly depends on whether or not complications develop. However, if left untreated, IE is fatal. Mortality increases with age, as well for those who have an infection with a resistant organism or who delay pursuing treatment (Huckell, n.d.).

Having shared and exchanged their respective knowledge about the situation, the care team needed to reexamine the treatment options for Mr. W.

MEETING OF THE CARE TEAM

Dr. Michael Silverman – PWID Management
Dr. Michael Silverman, Chief of Infectious Diseases at London Health Sciences Centre and St. Joseph's Health Care London.

Dr. Liam Newman
Dr. Liam Newman is an attending physician at London Health Sciences Centre and St. Joseph’s Health Care London.

Dr. Sharon Koivu
Dr. Sharon Koivu has been a physician of over 30 years and is the Site Chief for London Health Sciences Centre.

Donna Ladouceur – Community Care Access Centre
Donna Ladouceur is the Vice President of Patient Care at the Southwest CCAC.

Julian Morrison – London CAReS
Julian Morrison is the Managing Director for London CAReS, which is a community-based housing-first service that strives to improve the housing and health situations of homeless individuals.

CARE OPTIONS

Option One: Care in the Home

"So in Option One, endocarditis is primarily treated in an out-patient setting, where a nurse can visit the patient once a day to administer antibiotics through a PICC line?" Julian asked.

"Right," Dr. Silverman confirmed. "It's also recommended that nurses themselves subcutaneously inject the opioid rather than having the patient do it themselves, as there is a risk that the patient will sell their prescribed opioids or overuse the drugs themselves."

Dr. Newman asked why the hospital could not just give the patient an oral medication. Dr. Silverman explained that opioid medication is generally not prescribed in these situations to avoid the risk of the patients selling the medication when they leave the hospital.

Having established that antibiotics administered through IV was the most likely and most appropriate course of action, Dr. Silverman noted this approach was also the most difficult: "There are many confounding complications arising from treatment associated with the use of PICCs," he explained. "Often times, the PICCs will be a source of secondary infection. Meanwhile, nurses don't like maintaining the PICCs when they know the patients are using it for their own illegal drug use."

Julian remarked that, "Also, patients may not have a suitable housing condition, while community shelters tend to avoid accommodating people who inject drugs."

Dr. Silverman chimed in, noting: "This, in effect, creates a population of homeless drug-addicted patients with PICC lines."

"Isn't this the role for community-care associations?" asked Julian.

Community Care Access Centres

CCACs have transformed health care. They facilitate more than three million home visits a year to patients that would otherwise be in a hospital's Intensive Care Unit. The majority of the patients that CCACs serve can be considered very complex. CCACs do not provide direct care, but services are provided 24/7 by contracted service providers and health professionals. The CCAC's care coordinators do, however, direct 17 nurse practitioners. Overall 15,000 referrals are derived from the LHSC for home care, of which, 100 are for IV therapy in the home and 10-12 are patients with IV drug use.

Two legislative acts govern the functioning of the CCAC including the *Ministry of Health and Long-Term Care Act* and the *Community Care Access Corporations Act, 2001*. The acts mandate that patients have a health card; however, the CCAC will often provide care to individuals without one, using charitable donations. The CCAC is obligated to provide a safe environment for care, although this is often controversial.

"The community organizations do great work," Dr. Silverman noted. However, he explained that there are various goals that need to be accomplished in order for the CCAC and others to best serve these vulnerable populations. He continued, "It is important that a care coordinator is involved and connected with these patients early on during their care while registered nurses and personal support workers need to be involved and educated about how to work with such populations. Unfortunately, there are difficulties that must be addressed as well, including tight financial budgets, withdrawing care providers, and nurse safety without police resources available."

“Safety of nurses? Police?” Julian asked, with a puzzled look.

Seeing the look of confusion on Julian’s face, Dr. Newman explained that, there were concerns that requiring nurses to administer IV drugs to known drug users in the drug user’s home might put the nurse in a risky situation. “Some have even suggested that police should escort the nurses – especially given that other drug users, not necessarily the patient, might pose a risk. There simply are not sufficient resources for this, however,” Dr. Newman continued.

“On the plus side,” Dr. Newman added thoughtfully, “there are various actions which can be taken to improve the management of injection complications. First and foremost, the use of safe injection sites can be promoted as a place to access sanitary water, equipment, antibiotics, and nurses. As well, responsibility and liability needs to be clarified for the health care providers and community care providers – and even manufacturers of narcotics – to ensure that patients are using equipment and medication properly and safely. Additionally, a model can be implemented in which a police officer is present in such scenarios to promote the safety of the patient and the health care professional. Finally, legislation and policy can potentially be established to protect physicians and hospitals from lawsuits when patients misuse narcotics.”

Dr. Silverman also pointed out that he had recently heard a talk from the Vice President of Patient Care at the Southwest CCAC. “They are aware of the problems, and they are committed to helping address them. However, there is the challenge that the patient in question has no fixed address,” Dr. Silverman reminded the group. “Even if home care was appropriate for this patient, there is no home to speak of.”

“Let’s discuss another treatment option then,” Dr. Newman decided, “we can always come back to this idea later.”

Dr. Silverman nodded.

Option Two: Treatment in Hospital
“Can’t the patient just be admitted to the hospital?” Julian inquired.

Dr. Newman recounted to Julian the conversation the care team had been having about the challenges with hospital admittances.

“It’s just not that simple,” he concluded.

“The good news,” Dr. Silverman observed, “is that LHSC is aware of the problem and has really adopted a harm reduction focus.”

Dr. Silverman pointed out that treatment in a hospital was possible, but not ideal: “As you can understand, this is also a challenging option for hospitals too. There’s often pressure to discharge patients quickly, as a result of bed shortages and financial penalties for an excessively long length of stay. Hospitals are also especially tasked by drug addicts suffering from endocarditis.” He continued to explain that IE accounted for approximately 2000 days of hospital stays, with 12% mortality in hospital and 14% mortality after discharge. “Meanwhile,” he continued, “there remains a low patient follow-up rate with physicians who prescribed antibiotics to persons known to inject drugs – less than 20%, if you can believe it!”

Option Three: No Treatment
The last option is to provide no treatment for PWID suffering from IE given the challenges.

“What happens if a patient doesn’t get treatment?” asked Julian.

Dr. Silverman shuffled in his seat, and pushed his glasses up his nose. “A 100% mortality rate,” he quietly responded.

NEXT STEPS – ACTION PLAN

How should the care team proceed with treatment for the endocarditis patient? Taking into account all of the pros and cons, should they proceed with treatment in the hospital, at home, or no treatment at all? What about other options not considered? Are there options that address more than just the infection and consider the addiction problem and the psychological problems that may be accompanying or underlying the addiction?

EXHIBIT 1
Symptoms of IE

Symptoms of IE include fever, rigors, night sweats, anorexia, weight loss, and arthralgia. In terms of cardiac signs, the manifestations of a new heart murmur or alteration in an existing murmur are both indicators of IE. Skin lesions associated with IE may include petechiae, splinter hemorrhages, Osler's nodes, and Janeway lesions, as well as Roth spots (retinal hemorrhages) (Ashley & Niebauer, 2004). Neurological symptoms include embolic stroke with focal neurological deficits, as well as intracerebral hemorrhage and multiple micro abscesses (Brusch, 2015).

Major blood culture criteria for IE	• Two blood cultures positive for organisms typically found in patients with IE; • Blood cultures persistently positive for one of these organisms from cultures drawn more than 12 hours apart; • Three or more separate blood cultures drawn at least one hour apart.
Major echocardiographic criteria for IE	• Echocardiogram positive for IE is documented by an oscillating intracardiac mass on a valve or on supporting structures, in the path of regurgitant jets, or on implanted material in the absence of an alternative anatomic explanation; • Myocardial abscess; • Development of partial dehiscence of a prosthetic valve; • New-onset valvular regurgitation.
Minor criteria for IE	• Predisposing heart condition or intravenous drug use; • Fever of 38°C (100.4°F) or higher; • Vascular phenomenon, including major arterial emboli, septic pulmonary infarcts, mycotic aneurysm, intracranial hemorrhage, conjunctival hemorrhage, or Janeway lesions; • Immunologic phenomenons, such as glomerulonephritis, Osler nodes, Roth spots, and rheumatoid factor; • Positive blood culture results not meeting major criteria or serologic evidence of active infection with an organism consistent with IE; • Echocardiogram results consistent with IE but not meeting major echocardiographic criteria.

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LEGISLATION

Community Care Access Corporations Act, 2001, SO 2001, c 33.

Ministry of Health and Long-Term Care Act, RSO 1990, c M.26.

INSTRUCTOR GUIDANCE

Policy Meets Practice – People Who Inject Drugs (PWID)

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BACKGROUND

Dr. Silverman is the Chief of Infectious Diseases at London Health Sciences Centre (LHSC) and St. Joseph's Health Care in London, Ontario. He is concerned about the increasing prevalence of people who inject drugs (PWID) in London, and the risk to PWID of bacterial infections due to contamination (e.g., improperly or unsterilized injection equipment, skin not being sterilized before injection). Of primary concern is the risk of infective endocarditis (IE), an infection in a patient's heart. Treatment for IE entails antibiotics administered through the intravenous (IV) route. IE is generally treated through home care; in London, the South West Community Care Access Centre (CCAC) is responsible for delivering home care. To treat IE at home, a patient would need a peripherally inserted central catheter (a PICC-line) and assistance from a CCAC nurse to administer the antibiotics. This option, however, is not viable for some patients, including those who fall under the category of PWID or who may not have a fixed address. In the case of PWID, the PICC-line, in effect, becomes a "highway" for injecting other drugs; in instances where a patient may not have secure housing or be homeless, the CCAC nurse may not be able to track down the individual. When a patient in one of these situations is being treated for IE, it puts the care team in a difficult position. The alternatives to home care are hospital admittance or no treatment at all, neither of which are ideal solutions. Dr. Silverman is currently in this position, as he must decide on a treatment plan for Mr. W., a patient who has IE, has struggled with drug addiction (the likely cause of his IE), and who does not have stable housing. In making his decision, Dr. Silverman has included on Mr. W.'s care team two other physicians from LHSC, a representative from the CCAC, and the managing director of London CAReS, a community-based housing-first organization. The care team must determine the best treatment plan for Mr. W.

OBJECTIVES

1. Identify the role of key stakeholders in health care decision-making.
2. Discuss and identify barriers for vulnerable populations (e.g., PWID, homeless individuals) to accessing health services.
3. Understand the concept and importance of inter-professional collaboration for health care delivery.
4. Identify the key stakeholders and effectively engage with them to determine different barriers to delivering home care to vulnerable populations
5. Discuss and identify how competing priorities (e.g., safety of nurses, efficacy of treatment, financial impact) influence health care treatment decisions.
6. Understand the role of community organizations in the prevention, treatment, and management of health care issues.

DISCUSSION QUESTIONS

1. What is the main problem or issue discussed in the case?
2. What role do family meetings have in health care delivery?

3. Who is on the care team and what are their roles? Are there any notable absences on the care team? Who else should be on it?
4. What are some factors or reasons that make treating PWID for IE especially difficult?
5. What is the role of collaboration or inter-professional collaboration in health care delivery? Do you think it is important? Why?
6. Who is responsible for ensuring a positive outcome for patients receiving home care?
7. What are some key challenges or barriers to incorporating community organizations in treatment decisions?
8. What are some of the factors that might be contributing to the increasing problem of drug addiction, and specifically the injection of drugs, in London? Who should be involved in helping to identify solutions?
9. What are the legal and ethical obligations of the care team? What about the CCAC nurse? The community organization?
10. How important is it to consider the financial impact of different treatment options?

KEYWORDS
People who inject drugs; endocarditis; homelessness; home care; treatment; health care delivery.