

Ottawa Science Innovation Challenge

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The logo for the Ottawa Science Innovation Challenge (OSIC) is presented on a white rectangular background with a slight drop shadow. It features a stylized blue cell-like icon on the left, composed of a circle with a smaller circle inside and several short lines extending from the outer boundary. To the right of the icon, the letters "OSIC" are written in a bold, dark blue, sans-serif font.

OSIC



Acknowledgements

This case was developed by Justen Choueiry, George Liu, Connie You and Anne Zhao from the University of Ottawa.

Case designed by Dilpreet Bajwa

A message from the authors...

“You are about to be presented with 3 independent cases, where each of them highlights a specific issue within the much broader spectrum of The Opioid Crisis. While the cases are all fictitious, they are representative of scenarios that can occur in real life. As you read, try to identify potential issues that can be investigated further and ask yourself questions when something is not fully clear. Keep in mind that the specific characters and storylines are not important, but the issues surrounding the Opioid Crisis are.

Be attentive, be skeptical, and be creative. Best of luck to all!”

Case 1 - CONFLICTED

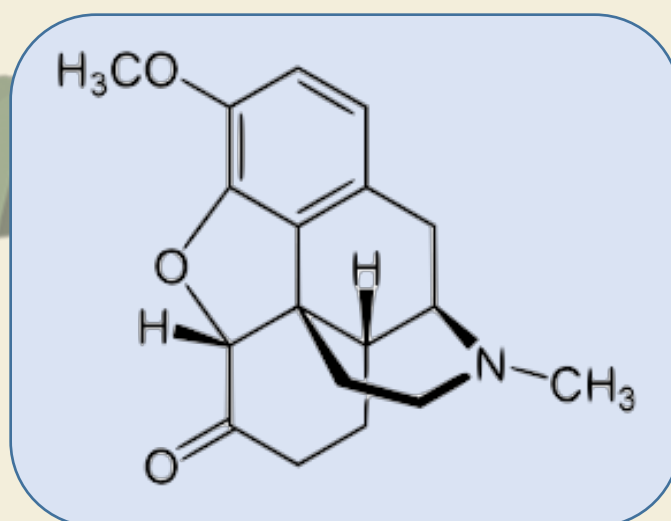


Dr. Levesque sat in his office, crouched over, with his head in his hands.

13 of his former patients had arrived back at his hospital this month alone, all with the same story. He had prescribed them pain medications for everything from severe injuries to chronic pain to post-surgery recovery...

And then they all got addicted.

But the prescription drugs were just too expensive to keep up with, so they turned to the streets. Heroin, fentanyl, morphine, and whatever else they could find...



He let out a heavy sigh and rubbed his temples. *Why?* he asked himself, *some people walk in, get a prescription, have a smooth recovery, and never touch the drugs again... but why are so many others getting hooked?*

Dr. Levesque shook his head. He had been prescribing opioids to his patients for over 30 years, and many *did* come back with struggles of addiction. Yet, it had never quite taken a toll on him like it was doing now. With everything in the recent news and media about the opioid crisis, he felt more and more responsible for his role in the whole ordeal.

There must be another way, he thought, *there ha—*

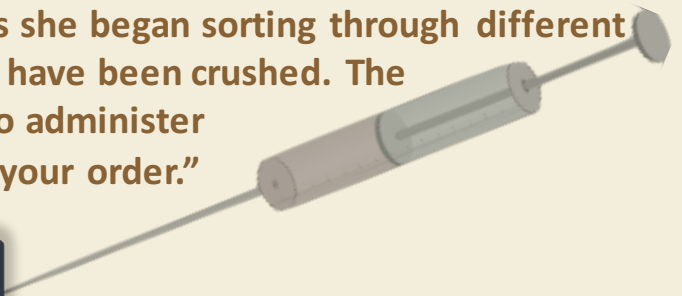
His thoughts were interrupted as a nurse frantically barged into his office. “Doctor, we have a new patient, critical condition. We need you in the ER ASAP.”

As soon as Dr. Levesque entered the Emergency Room, he grimaced. A young man, no older than 16, lay on his side atop a stretcher. With his jaw clenched shut, the boy was breathing heavily and trying not to move.

He was supporting his lower back with one hand, and with his other, he was clutching tightly to a woman's hand, presumably his mother's.

"Terrible accident," a nurse explained as she began sorting through different tubes and needles. "A couple vertebrae have been crushed. The patient is in a lot of pain and we need to administer morphine immediately. Just waiting on your order."

PAIN



Dr. Levesque froze. The young man was tall and fit for his age. While his face was distorted by pain, it was still evident that he was quite handsome. It dawned on Dr. Levesque that this young man had his whole life ahead of him.

If he administered the painkillers now, how would that affect the rest of his life...?

The mother stood up suddenly. "HELLO?" she shouted at Dr. Levesque. "Are you even LISTENING?? My son is literally about to die and you're standing there like a deer in the headlights? Aren't you a doctor? Give John what he needs!"

John groaned loudly from the stretcher.

Dr. Levesque rubbed his forehead, let out another deep sigh, then nodded to the nurse. "Proceed with the dosage and prepare for surgery."

The procedure was as smooth as could be, and a few days later, Dr. Levesque decided to go check up on John. He appeared to be recovering well, and of course, was still on regular morphine doses.

John's eyes widened as Dr. Levesque entered his room. "Whoa... who are you?" John asked, almost in a daze. Dr. Levesque made a mental note that John must have been given his medication recently.

"I'm Dr. Levesque, how are you doing John?"

"Haha, you know my name. That's cool. It's nice to meet you, Dr. Le Vet." John yawned. "I'm doing pretty dandy! How are you?"

Dr. Levesque smiled, but it was sad smile. There was so much energy in this young man's eyes... but he couldn't help himself from picturing all the weary, sunken looks that so many of his patients had come back to him with...

"I'm doing alright John," he replied.

"Ya know, Dr. Le Vet, I love vets. You're so cool because you're a doctor and a vet!" John began to giggle to himself.

Dr. Levesque was relieved to see that John was doing well and decided there wasn't much else to say. He stood up and made his way for the door.

"Thanks for your help, Doc," John called out to him.

Dr. Levesque turned.

Something about the boy's tone had changed... despite the effect of the drugs, it was suddenly very calm... more sincere...

Then the innocent, goofy expression returned. “What would I do without yooou, Doc? Thank you sooooo much, Doc. You’re a reaaal life saver!”

Standing in the doorway, Dr. Levesque shifted uncomfortably. He wanted to say something encouraging, something hopeful... but the words got choked up in his throat. All he could manage was one more weak smile.

As he turned and left the room, a single tear rolled down his cheek...

Don’t thank me just yet, he thought.

What are side effects of opioid consumption doctor?

Side effects of opioids include itchiness, sedation, nausea, respiratory depression, constipation and euphoria



Case 2 – “CHILL”



James scrolled lazily through his Instagram feed in the backseat of his mom’s silver Corolla. There was a cute dog video here, some funny memes there. He paused at a particular post and frowned.

It was another one of those Health Canada warnings about fentanyl in street drugs or something.



He felt like he was seeing those everywhere... it was really starting to annoy him.

As they pulled up to the party, James could feel the car seats vibrating in tandem with the loud thumping beats of music from outside. He opened his door and didn’t even get both feet on the ground before his mother began shouting after him

“Be safe honey! I love you! Remember that—”

“STOP IT MOM, you’re embarrassing me!” James hissed

“I know, Mom! You already told me this like a million times.”

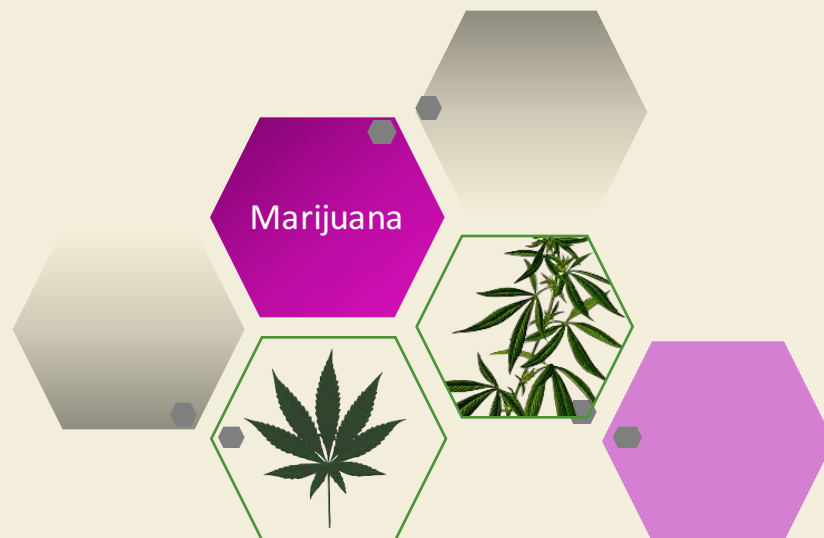
“Be home by 11pm sharp, young man!”

It was Angie's 19th birthday, her parents were out of town, and it was meant to be one for the books. Pretty much everyone that was anyone was invited to the party... which made James feel kind of good about himself.

As he entered Angie's gigantic mansion, he was starkly greeted by the potent smell of marijuana.

"Yo James, over here!" shouted Ben. Ben was one of James' closest friends from their early childhood and despite having made some very different life choices since then, the two were still very close. James made his way towards Ben through the packed crowd of teens.

"Ben, I didn't know it was THIS kind of party" exclaimed James.




"Chill, bro. The party hasn't even started yet" replied Ben, pulling out what appeared a poorly wrapped cigarette and spinning it between his fingers.

"Look what I got off the streets today!"

James shook his head. "Dude put that away, you know I'm not into that."

"Fine James Lames," Ben winked at him. "If you say so!" Ben proceeded to light the joint and took a couple puffs. "See? Am I dead yet? What's there to be so scared of?" Ben playfully punched James in the arm.



**Addictive and
may result in
fatal overdose**

**Relieves
chronic Pain**

James frowned. He was never really that curious about drugs. They just seemed so... strange to him.

Either that or it was just the way he was raised. James thought of how his mom would react if she caught him using drugs... and shuddered. Yup, definitely the way he was raised.

As the night went on, most of the group had eventually migrated to the backyard. Someone started singing “Happy Birthday” for Angie and almost instantly, everyone else chimed in. At the end, after some more laughs and shouts died out, Angie decided to say a few words.

“Thank you guys sooo much for coming. This is literally the best party I have ever had” Angie said, drunkenly slurring her words.

People began to cheer wildly again, raising solo cups and lighting more joints. James checked his watch and saw it was getting dangerously close to 12am... it was time to call it a night. He walked over to Angie, gave her a hug, and wished her a happy birthday. Then, just as James was walking back towards the house, he froze in his tracks.

Ben was sprawled out on a lawn chair... eyes closed and unmoving. James approached his friend slowly... a wave of fear suddenly rushing over him.

Ben's fingernails and lips had both turned
BLUE!

"Ha haaa! Everyone look at that lightweight over there!" someone shouted from the crowd.

James reached out and checked for Ben's pulse. It was abnormally slow. Ben still didn't move.

Angie walked over to see what was going on, only to gasp when she saw Ben. "Oh my gosh! Someone has had way too much alcohol!" she shrieked.

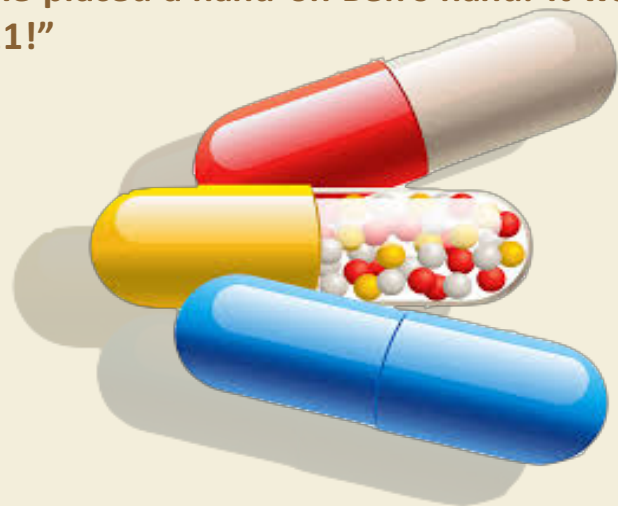
"No," James replied, his voice beginning to quiver. "This is different... I...I think he's... overdosing."

"But overdosing on weed is like impossible!" Angie insisted.

James pulled out his phone and scrolled back to the Health Canada post. He read through the symptoms and his eyes widened. "I d-don't think... I don't think it's weed," James stammered. He placed a hand on Ben's hand. It was ice cold. "S-someone needs to call 911!"

Everyone at the party froze.

"I SAID SOMEONE CALL 911!"



Case 3 – URGENCY



“4033 ETA?”

“4033 to Dispatch, 3 minutes out.”

Nick heard crackles of static and a burst of radio activity, “Two EMT’s on the scene, one on standby.”



The ambulance soon screeched to a halt in front the suburban house where the emergency call was reported. Nick gasped... it was his aunt’s house. He and his partner, Tyler, got out and rushed towards the front door.

Nick, knowing fully well that his aunt never locked her doors, immediately reached for the handle and flung the door open.

“What are you do-“ Tyler began, slightly shocked by Nick’s nervous energy.

Without a word, Nick rushed inside the well-lit home. He paused in the foyer, attentively listening for any signs of his aunt. He heard what he was looking for and ran to the kitchen, Tyler following closely behind him.

On the ground, groaning through gritted teeth, was Nick’s aunt, Cindy. She clutched the back of her neck in one hand, and her enormous baby belly in the other. Next to her was a chair that had fallen over.

Nick rushed to her side. “Aunt Cindy!”

“Nick, is that you? Please help me! I’m in so much pain!” Aunt Cindy cried out. “I... I was reaching for some sauce on the upper cupboard, and I lost my balance. Agh!”

“Don’t worry Aunt Cindy, you’re in good hands!” Nick looked over to Tyler.

“ Be gentle with her, buddy, she has a history of fibromyalgia, I suspect the fall is causing her pain to flare up as well. ”

Tyler nodded. They quickly loaded her onto the stretcher and brought her back to the ambulance.

As Tyler manned the wheel and sped back towards the hospital, Nick sat next to his aunt. With every bump in the road, she seemed to be feel more pain.

“Nick...” she was struggling to talk.

Nick held onto one of her hands, “Cindy, it’s going to be okay. We’re going to get you to the hospital and we’re going to get you on some medication for your pain. Everything is going to be okay.”

Cindy’s eyes widened. “But... the... baby...” she gasped. Before she could say anything else, the ambulance jolted violently. Tyler must have run over a pothole. With a sharp shriek, aunt Cindy passed out.

“Dang it, Tyler!” Nick shouted as he placed Aunt Cindy’s hand gently back onto the stretcher. He looked down at her limp body. What was she trying to say? he wondered briefly. Then he shook his head. Whatever it was, I’m going to make sure you get the care you need.

A few days later, Nick went back to the hospital to check up on his aunt. When a nurse informed him that Cindy had given birth the day prior, he became even more excited and rushed in to see her.

As soon as he entered her room, however, his excitement faded quickly. Aunt Cindy was sitting up in her bed, anxiously fidgeting with her fingers. Nick could tell something was wrong.

Nick walked over to her bedside. "Hey auntie, how's it going?"

Cindy didn't respond. She didn't even look towards him.

"Are you feeling better?" Nick began again.

"I don't feel a thing... guess the meds are working" Cindy replied bluntly. An awkward silence ensued"

Nick couldn't help but feel a tinge of annoyance. I saved your life, at least you could say thanks, he thought to himself

Cindy sighed "Look Nick, I appreciate what you did for me," she began, "but I'm really concerned about—"

Just then, a doctor walked in with an uneasy look on her face. Both Cindy and Nick turned towards her. The doctor kept glancing down at her clipboard and back at Cindy.

"What's the matter, Doc?" inquired Nick.

The doctor bit her lip. "It's the baby..." she said. "He's... he's showing withdrawal symptoms."

Nick's heart dropped. It dawned on him that Cindy wasn't worried about herself at all; she was worried about the painkillers affecting her baby. He looked back at Aunt Cindy, whose face had fallen into her hands as she sobbed violently.

What had he done?

The Challenge

So, now that you've read through the cases, how will you approach the Opioid Crisis? In forming your own research proposal, try to decide on an issue that you feel most passionately about first, then ask yourself as many questions as you can about where you can go with it. If none of the cases particularly intrigued you, it is highly encouraged to explore further details through your own research! Remember, the cases were designed purely for inspirational purposes and do not cover all aspects of the Opioid Crisis. To summarize, we have compiled some of the main issues seen throughout the cases below. Further questions to consider are also listed in the adjacent column. To reiterate, you are not limited to these problems; please feel free to explore your own ideas!

Problem highlighted	Questions to consider / explore
Opioids are being over-prescribed	How does pain work? How do opioids work? Can an alternative painkiller be developed?
Opioid use often leads to addiction	Is there a genetic basis for addiction susceptibility? Is there a way doctor's can screen patients before prescription?
Street drugs can be laced with unknown substances	Is there any way to test for opioid presence? Could the test be made commercially available?
Potent opioids can lead to overdose even when consumed in small quantities	Why are opioids so dangerous? Can the harmful effects be reduced without affecting the benefits?
Neonatal Abstinence Syndrome is a serious issue that affects innocent newborns	Why and how do the babies get affected? Is there any way to prevent this?
Bonus Naloxone is the most commonly used drug to immediately treat overdose	How does it work? Does it have any side effects? Are there any ways to reduce / alleviate these side effects? Is there a better way to treat overdose patients?



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