



Impact of Opioid Related substances on Yukon Youth

By: Hassan Amir | Edited by: Crystal Radinski | Layout by: Ahmed Nadeem

Age: 16 | Calgary, AB

Bronze Medal Excellence Award, Canada-Wide Science Fair Finalist, Yukon Stikine Regional Science Fair Winner, SHAD Canada \$3000 Scholarship Award, 2nd Place Prize Youth of Canada (YOC) Awareness Challenge and University of Western Ontario \$1000 Scholarship Award

The World Health Organization (WHO) reports around 500,000 deaths yearly due to substance use (World Health Organization, 2018). The WHO also reports that approximately 70% of these deaths are due to opioid-related substances (World Health Organization, 2018). Opioid-related substances are classified as drugs with pain-relieving properties (John Hopkins Medicine, n.d.). These properties may drive addiction. (John Hopkins Medicine, n.d.). Opioids are often administered or prescribed after major medical health complications, such as post-surgery treatment, severe injuries and chronic pain (John Hopkins Medicine, n.d.).

Alarming, current trends and data show an exponential rise in opioid-related substance use among Canadian youth (Health Canada, 2018). In 2016 and 2017, 3% of Canadian youth ($n = 61,000$) used opioid-related substances for non-medical reasons (Health Canada, 2018). In the years 2010 to 2016, opioid-related hospitalizations rapidly increased among youth adults aged 15 to 24 (Health Canada, 2018). Further, 10% of all substance use deaths among youth in Ontario, Canada's most populous province ($N = 14,570,000$), were due to opioids (Chief Public Health Officer's Office, 2018). Interestingly, while these mortality trends may be specific to Ontario, national hospitalization data mirrors these findings, showing that the age group of 15 to 24 years experienced the fastest-growing rates of hospitalizations related to opioid overdoses between 2007 to 2016 (Chief Public Health Officer's Office, 2018).

Within the territory of the Yukon, a similar situation has unfolded over the past six years (Juanita et al., 2021). In 2021, Heather Jones, the territory's chief coroner, reported that the Yukon now has the highest rate of deaths due to opioids in the country at 48.4 deaths per 100,000 people (Juanita et al., 2021). In 2021 alone, the Yukon territory recorded 23 deaths due to opioids (Juanita et al., 2021). Nationally, Canada has a rate of 19.4 deaths from opioids per 100,000 people, significantly lower than the Yukon (Juanita et al., 2021).

PURPOSE

This mixed-method analysis research study aimed to effectively identify critical disparities and problems with opioid-related substance use within Yukon youth and uniquely develop solutions to the obsolete issue. This novel study determines the statistical correlation between opioids and youth. Further, extracting key health determinants, through a comprehensive evaluation methodology

ensures unbiased and credible results. Research assessments were analyzed to ensure minimal recency bias. This study implements socioeconomic, racial and gender analysis and background educational data. Applications of descriptive and inferential statistic techniques are further incorporated for analysis.

HYPOTHESIS

Null Hypothesis H0: Through preliminary background research and speculation, opioid-related substances will have no impact on youth due to improvements in opioid-related resource distribution, developing of accessible relief programs and the further development of innovative approaches to educating youth on opioid-related substances.

Alternative Hypothesis Ha: Opioid-related substances will have a significantly lower negative impact on youth by tackling opioid-related resource distribution, developing accessible relief programs, and developing innovative approaches to educating youth on opioid-related substances.

Materials and Methods

Quantitative Survey methodology

Survey questionnaires were distributed manually across two secondary school institutions located within the city of Whitehorse, and this reflected 50% of major secondary school institutions within the territory. The survey rationale intended to investigate youth's opinions, trends and attitudes towards opioid-related substance use.

The sampling frame was defined as students from the age category of 12 to 18 years of age and secondary school students who attend Frederick Howard Collins Secondary School and the Independent Learning Center. The sample was provided with a letter of declaration, stating the purpose and significance and asking for the consent of participants. In terms of sampling design, a multi-stage clustering sampling technique was implemented at both institutions. The population within the sampling frame was divided based on Grade level, resulting in five major clusters: grade 8, grade 9, grade 10, grade 11 and grade 12. Further, all five



This work is licensed under:
<https://creativecommons.org/licenses/by/4.0>



major clusters were then sampled. Sampling techniques involved the use of probability sampling, where 60 students, within each cluster were randomly selected through the use of a database collection application. This ensured minimal bias, which resulted in an accurate representation of the population. The research study involves stratification, ensuring an assessment of specific population characteristics, such as gender and race.

Qualitative Research Methodology

A systematic literature review on the effectiveness of drug substance policies aimed at youth was carried out. Multiple research study types were selected for further analysis: cross-sectional studies, economic evaluations and case studies.

Studies were included based upon three basic principles: (1) Drug substance policies were targeted for youth, (2) included a policy that targeted at least one dimension of opioid-related substance use as an outcome (any variables related to either knowledge and/or attitude and/or behaviour were considered), (3) the evaluation was qualitative. Appropriate studies were identified in medical research study directories: PubMed and Medline (yielded 673 citations), while 42 additional citations were identified through basic preliminary queries on Google Scholar and through basic examinations of references of relevant papers. Seven hundred thirteen studies remained after duplicates were removed. Six hundred eighty-seven studies were excluded, as they did not meet basic criteria expectation principles.

After careful reviews of the full text of the remaining 26 citations, 16 studies were excluded for specific reasons, which are listed in the flow chart (fig. 1). Ten studies were included in the final review.

RESULTS

Quantitative Survey Findings Overall Findings

Multiple key data findings were found within the resultant data. All key data points, along with graphical tabulation (fig.2), are listed below:

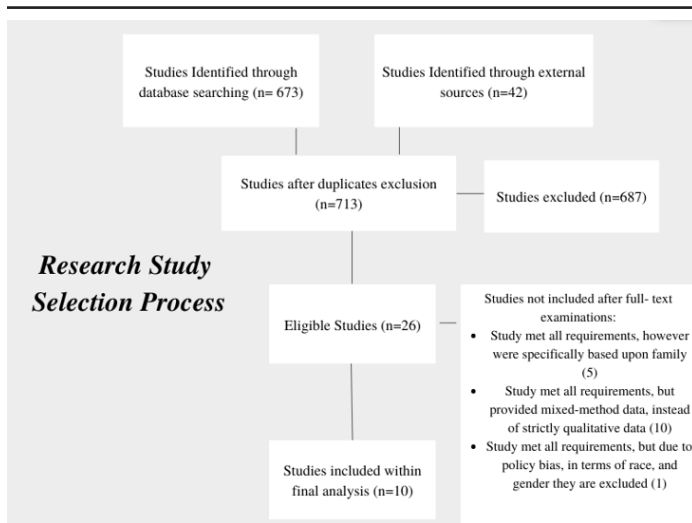


Figure 1: Protocol for study selection

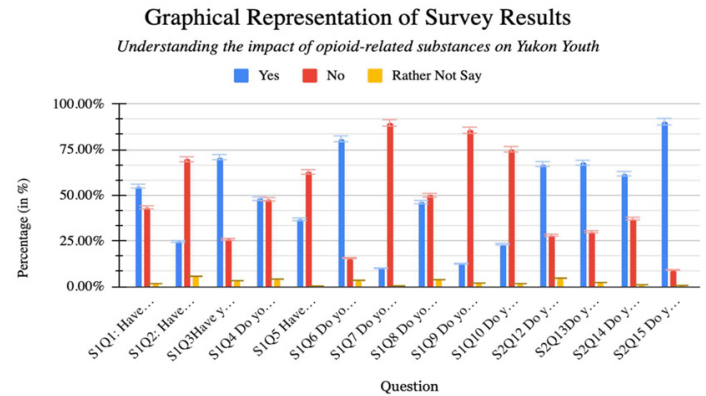


Figure 2: General Overview of survey results (Question 11 is not listed)

55% of respondents reported that they had taken any kind of drugs illegally. 24.7% of respondents reported having taken opioid-related substances, in the past. 62.8% of youth have never been educated about opioid-related substances and their fatal impact on health and communities. 80.9% of secondary school students believe that stigma is prevalent within our communities. 89.6% of youth were not aware of mental health and opioid-related substance use resources. 50% of respondents were not aware of any family members, relatives or friends who received Naloxone administration training, or education. 75% of students were not aware of the local not-for-profit organization Blood Ties Four Directions, which specializes in opioid-related substance use resources and programs for youth in the territory of the Yukon. 67.1% of respondents consider that educational brochures, pamphlets, and posters can help compose a reasonable change in better informing secondary school students of opioid-related substances. 78% of registrants acknowledge on the occasion that secondary school students were to be educated on opioid-related educational subjects, which would reduce the use of opioid-related substances among youth. 61% of youth recognized current educational curriculums within the territory as outdated when it comes to content such as opioids, general substance use, and mental health. 90% of students believe that social media platforms can play an important role in uniquely instructing youth on illicit opioid-related substances. In Question 11, 97% of youth preferred social media awareness campaigns as the advantageous choice for educating youth about this critical crisis.

The majority, 89.4% of respondents, were reported to be residents of the city of Whitehorse, Yukon. 3.1% were reported to be residents of Dawson City, the second-largest town in the territory of the Yukon. Participants from Haines Junction and Watson Lake further contributed to community demographic data, with both communities representing an equal percentage of respondents, at 2.1% (figure 3).



In terms of racial makeup, the majority of respondents, 80.8%, identified themselves as Caucasian or White. The Southeast Asian category reflected the second-largest racial group with 9.3% of respondents identifying themselves as of Southeast Asian descent. The First Nations/Aboriginal was the third largest racial group reflecting 4.1% of all respondents. Other notable racial groups include Black (2.2%) and Eastern Asian (2.2%) for details (fig. 4). In terms of gender analysis, 54% of respondents identified themselves

as Male, whereas 43% of respondents described themselves as female. An additional 3% describe themselves to be within the “other” category. Among all four age groups, the categories were equally distributed, with each of the five age groups, at 25%.

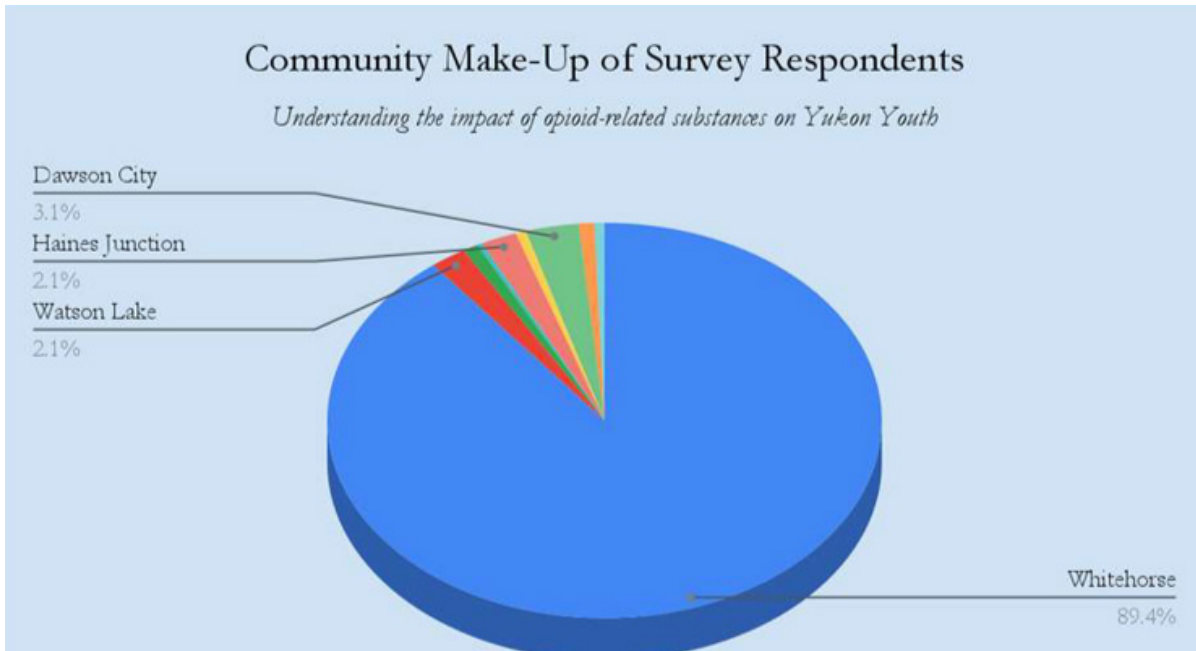


Figure 3: Community make-up of survey respondents

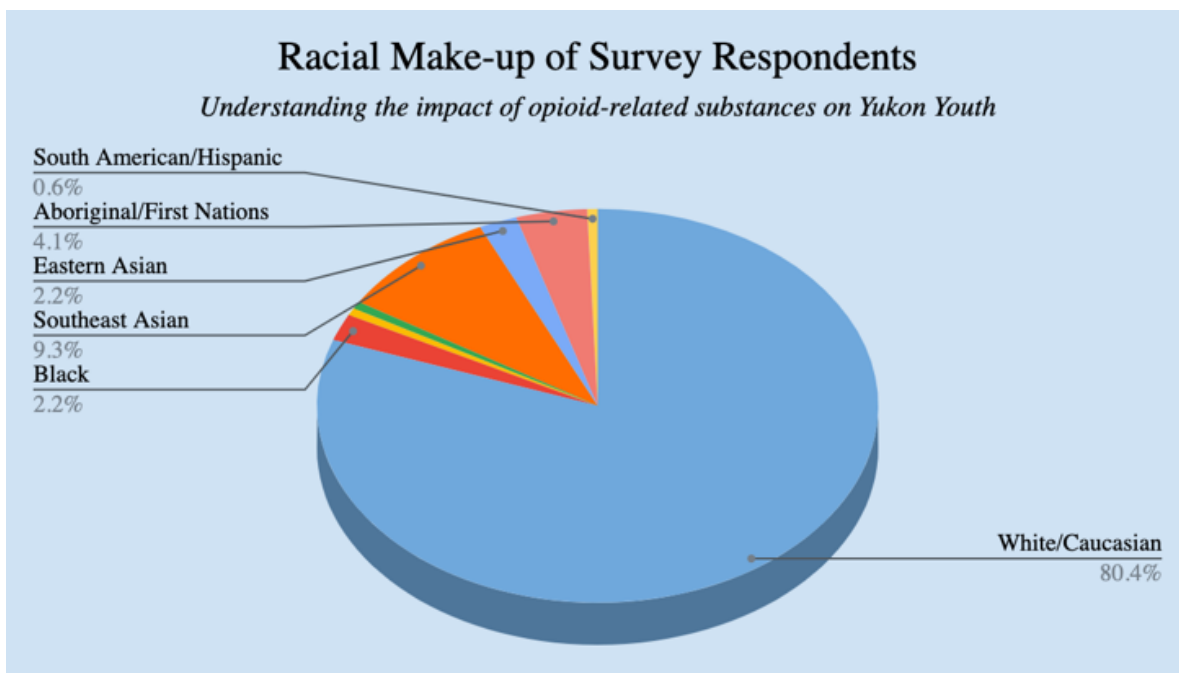


Figure 4: Racial make-up of survey respondents



Table 1: Value variance frequency within survey respondent data

Value	Frequency
1	115 (66.860465116279%)
2	55 (31.976744186047%)
3	2 (1.1627906976744%)

Interestingly, multiple additional statistical findings were discovered, which showed specific parts of the population that are struggling greatly in terms of opioid-related substance use within the territory. Two interesting correlations were found within the descriptive statistics analysis.

Male responses and opioid-related substance use rates were seen as a positive correlation, where the higher the general number of males, the higher the general opioid-related substance use rates. Yes, (2) No and (3) Rather Not Say categories were assigned a numerical number in the range {1, 2, 3}, additionally further all 54% of male responses were statistically analyzed based upon measures of central tendency, Standard Deviation, Value variance Frequency (fig. 5) and margin of error (fig. 6)

- Standard Deviation, s: 0.5006799483271
- Count, N: 172
- Sum Σx : 231
- Mean \bar{x} : 1.343023255814
- Variance, s²: 0.250067999456

Table 2: Margin of Error Table depicting the chance of error at each confidence level

Confidence Level	Margin of Error	Error Bar
68.3%, $s_{\bar{x}}$	1.343 \pm 0.0381 (\pm 2.84%)	
90%, 1.645 $s_{\bar{x}}$	1.343 \pm 0.0627 (\pm 4.67%)	
95%, 1.960 $s_{\bar{x}}$	1.343 \pm 0.0747 (\pm 5.56%)	
99%, 2.576 $s_{\bar{x}}$	1.343 \pm 0.0982 (\pm 7.31%)	
99.9%, 3.291 $s_{\bar{x}}$	1.343 \pm 0.125 (\pm 9.34%)	
99.99%, 3.891 $s_{\bar{x}}$	1.343 \pm 0.148 (\pm 11.05%)	
99.999%, 4.417 $s_{\bar{x}}$	1.343 \pm 0.168 (\pm 12.54%)	
99.9999%, 4.892 $s_{\bar{x}}$	1.343 \pm 0.187 (\pm 13.89%)	



Confidence levels determine the validity and accuracy of our proposed conclusions.

In terms of statistical analysis, the racial group First Nations/Aboriginal was significantly more affected than other racial groups. 94% of all Aboriginal youth said that they used any kind of drugs illegally, whereas 19% of Southeast Asian youth said that they took any kind of drugs illegally.

Qualitative Review Findings

Multiple qualitative findings were discovered within the literature review, which help in portraying the need for youth policy control, within government institutions. Multiple studies within the review show that youth-centred policies have been implemented in multiple parts of Europe, Africa, Asia and North America.

The review finds that the majority of nine studies have minimal youth-centred policies focusing on opioid-related substance use, within youth. The review displays that the nature of such studies shows that youth-related substance use is limited, in the literal sense. The review further finds multiple risks and protective factors relating to opioid-related substance use among youth. Furthermore, these studies explain the emphasis of such principles, when it comes to youth policymaking. Early childhood development, Income/Housing Policies and Physical/sexual abuse. These specific childhood factors are most commonly displayed in five studies.

These studies reveal how policies to tackle risk factors can help in lessening opioid-related substances. Seven studies acknowledge the lack of youth policies on substance use within the majority of healthcare sector policies around the world. Additionally, all studies acknowledge that there is a lack of youth representation within policymaking today. Further four studies find that the majority of contemporary youth-centred policymaking is largely ineffective, and further measures need to be taken to provide youth with adequate financial and social resources. Three studies find that a social and welfare policy approach should be taken to tackle opioid-related substance use among youth.

These studies say that financial investments should be implemented within communities to help prevent substance use's major problem, underfunded communities. Multiple studies further say that significant resources can be reallocated to create new community engagement services based on mental health services, naloxone training and community-informed practices. These studies acknowledge that current-day policies promote substance use among youth. Nine studies support decriminalization; these studies show that decriminalization would ensure that individuals who use, possess, or sell drugs are not subject to arrest, detention or conviction. This removes the need for a police apparatus for the enforcement of ineffective drug laws. These studies say that such laws have further led to racism among Black and Indigenous communities contributing to discriminatory enforcement. These studies say that a harm reduction approach is the best approach to ending substance use among youth.

Several studies say that such an approach is economically feasible for Canadian jurisdictions. Canadians spend approximately 42.9 million dollars a day on policing. Much of these financial

resources should be reallocated to social and welfare programs, which will cost much lower to run.

DISCUSSION

Mixed-Method Research Interpretation

In summary, the quantitative research performed displayed multiple key findings and data which would be critical in solving the opioid crisis within the territory of the Yukon. Key gaps and disparities within the Yukon public health sector were noticed. Statistical correlations and applications of multiple statistical techniques showed us specific characteristics of the population, which were greatly affected.

Firstly, social education programs should be further developed as the study shows clear gaps in knowledge and resources around opioid-related substances. Unique approaches to education should be created through the use of social media campaigns and online campaigns. Other educational options should be explored further, as youth indicate that educational initiatives will help develop change and reduce drug culture within secondary school institutions. The study further notices that resources, like Blood Ties Four Directions are available within communities; however, youth are not aware of such resources, resulting in higher rates of opioid-related substance use rates.

Resource distribution and racial groups should be targeted with financial and social welfare programs support. The study finds that specific genders and racial groups are far more affected than others. These groups should be targeted to deliver efficient and reliable results. Statistical applications can bring valuable analysis to the Yukon Opioid Crisis.

Despite ongoing efforts within the Yukon, stigma still harms youth across this territory. This study finds that almost all youth within the sampling frame still believe that stigma fosters in our communities. Mental health services must be youth-centred as these population groups are one of the most vulnerable to stigma and mental health-related disorders. Youth should feel that they are part of a broader respectful community within the territory of the Yukon.

In terms of qualitative research, the review deemed a substantial number of policies as ineffective due to the lack of youth representation, lack of youth-centred policies and minimal policies regarding opioid-related substance use in youth.

Policies must be developed in an open-minded way, through which youth are the epicentre.

Youth should feel represented in policy making regarding opioid-related substances. Development of youth-led initiatives should be further nurtured in municipalities and local institutions. Development of youth panels and/or councils is a conventional approach to policy making, which will result in multiple positive benefits, such as community engagement.

The study further finds that minimal policies have led to too little to no points of action regarding substance use. Such policies have no real effect but rather have been used as political tools for



many to gain a reputation or popularity. Policies like these should be eliminated for meaningful ones, through which youth's lives are free of opioid-related substance use entirely. Policies should be based on core factors that lead to opioid-related substance use. These factors can help in developing comprehensive policies in the future.

CONCLUSION

After a combination of quantitative and qualitative evidence, we reject the null hypothesis at a 5% confidence level. There is sufficient evidence to suggest that the development of social and welfare programs can lead to lower opioid-related substance use rates and, therefore, lower implications of opioids within the territory. Both qualitative and quantitative evidence suggests that the alternative hypothesis is correct and successful. Multiple final conclusions can be made from my findings: (1) The Yukon public health sector needs to continue to take immediate action against opioid-related substances, as data suggest that there is widespread use of opioid-related substances within the youth, (2) Local organizations and government institutions need to address the need for awareness within the territory, through unique approaches of educational campaigns and other related initiatives. (3) Youth need to be involved within government institutions to decide their own futures. (4) Youth policy should not be minimal or limited but rather at the epicentre of public drug substance health policies, (5) Stigma and Mental health need to be uniquely addressed through different initiatives, based upon the lines of the educational information technology sector (6) Specific racial groups and underprivileged communities, need to be addressed with more resources, for a more efficient targeted plan, (7) Naloxone training must be provided through workshops and training sessions to youth of older ages, (8) Construct secondary school environments where drug culture is actively suppressed, not promoted.

REFERENCES

- Anderson, J. (2018). Study to prevent deaths from opioid overdose shows promising results. World Health Organization. Retrieved April 30, 2022, from <https://www.who.int/news/item/06-08-2021-study-to-preventdeaths-from-opioid-overdose-shows-promising-results>
- Roberts, M. (2021, November 29). Yukon now has highest opioid death rate in Canada, Territory's chief coroner says | CBC News. *CBCnews*. Retrieved April 30, 2022, from <https://www.cbc.ca/news/canada/north/yukon-opioid-death-crisis-highest-rate-canada-1.6266866>
- Canada, H. (2022, March 7). Government of Canada. *Canada.ca*. Retrieved April 30, 2022, from <https://www.canada.ca/en/health-canada/services/opioids.html>
- Francoeur. (2022, January 21). Substance use health emergency declared in the Yukon. *Government of Yukon*. Retrieved April 30, 2022, from <https://yukon.ca/en/news/substance-use-health-emergency-declared-yukon>
- Mason, M., Welch, S. B., McLone, S., Bartell, T., Lank, P. M., Sheehan, K., & Post, L. A. (2021, April 21). A cross-sectional study of opioid involvement in non-poisoning suicide risks and Prevention Opportunities -BMC Public Health. *BioMed Central*. Retrieved April 30, 2022, from <https://bmcpublihealth.biomedcentral.com/articles/10.1186/s12889-021-10792-y>
- Krause, H. (2021). *Opioids in Canada*. *CIHI*. Retrieved April 30, 2022, from <https://www.cihi.ca/en/opioids-in-canada>
- Belzak, L., & Halverson, J. (2018, June). The opioid crisis in Canada: A national perspective. Health promotion and chronic disease prevention in Canada : research, policy and practice. Retrieved April 30, 2022, from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6034966/>
- Root, J. (2018). Health and Social Services November 2018 - December 2020 - Yukon. *Yukon Opioid ActionPlan*. Retrieved April 30, 2022, from <https://yukon.ca/sites/yukon.ca/files/hss/hss-yukon-opioid-action.pdf>
- Canada, G. of. (2018). Preventing problematic substance use of youth - Canada. The Chief public Health officer's report on preventing problematic substance use 2018. Retrieved April 30, 2022, from <https://www.canada.ca/content/dam/phacaspc/documents/corporate/publications/chief-public-health-officerreports-state-public-health-canada/2018-preventing-problematic-substance-use-youth/2018-preventingproblematic-substance-use-youth.pdf>
- CDC. (2021, February 11). Trends and geographic patterns in drug and synthetic opioid overdose deaths - United States, 2013–2019. Centers for Disease Control and Prevention. Retrieved April 30, 2022, from https://www.cdc.gov/mmwr/volumes/70/wr/mm7006a4.htm?s_cid=mm7006a4_w
- Melissa. (2019). Finding Hope: Clinical Strategies to Combat the Devastating Impact of the Opioid Epidemic on our Youth. Retrieved April 30, 2022, from [https://www.clinicaltherapeutics.com/article/S0149-2918\(19\)30391-1/fulltext](https://www.clinicaltherapeutics.com/article/S0149-2918(19)30391-1/fulltext)

ABOUT THE AUTHOR - HASSAN AMIR

Hello! My name is Hassan Amir and I am a grade 11 student in Calgary, Alberta. I currently attend Webber Academy. Outside of school, I have served as a legislative page within the Yukon Legislative Assembly and as a Youth Advocate on behalf of UNICEF Canada. In future, I aim to pursue a career within healthcare, specifically within a Translational Medical Research setting, with a focus on genomics and bioinformatics. In 2022, I attended the Canada-Wide Science Fair, where I was a recipient of a Bronze Medal Excellence Award, SHAD Canada Scholarship Award and University of Western Ontario Scholarship Award. I would urge all youth scientists pursuing science fair projects to stay curious and motivated!

