January 2020

E-cigarette Consumption in North American Schools

Abdul Hakim Merhi
University of Windsor, merhia@uwindsor.ca

E-cigarette Consumption in North American Schools

By

Abdul Merhi

A Major Research Paper

Submitted to the Faculty of Graduate Studies through the Faculty of Education in Partial

Fulfillment of the Requirements for the Degree of Master of Education at the University of

Windsor

Windsor, Ontario, Canada

2019

E-cigarette Consumption in North American Schools

By

Abdul Merhi

APPROVED BY:

_____

F. Cherian

Faculty of Education
_____

G. Salinitri, Advisor

Faculty of Education

November 7, 2019

Declaration of Originality

I hereby certify that I am the sole author of this major research paper and that no part of this major research paper has been published or submitted for publication.

I certify that to the best of my knowledge my major research paper does not infringe upon anyone's copyright nor violate any proprietary rights and that any ideas, techniques, quotations, or any other material from the work of other people included in my paper, published or otherwise, are fully acknowledged with the standard referencing practices. Furthermore, to the extent that I have included copyright material that surpasses the bounds of fair dealing within the meaning of the Canada Copyright Act, I certify that I have obtained a written permission from the copyright owner(s) to include such material(s) in my major research paper and have included copies of such copyright clearances to my appendix.

I declare that this is a true copy of major research paper, including any final revisions, as approved by my major research paper committee and the Graduate Studies office, and that this major research paper has not been submitted for a higher degree to any other University or Institution.

Abstract

E-Cigarette use has grown at an unprecedented rate in North America. Studies are being conducted to understand the social and health-related implications of this phenomenon. Teenagers are at the center of the discussion when e-cigarette consumption is researched and examined. Understanding the rate of growth and consumption relative to school settings is important to understanding this phenomenon. A knowledge synthesis is provided to direct the following questions: (1) Where are teenagers consuming e-cigarettes? And why? (2) What are some current North American policies that address smoking and vaping in schools? (3) Why is the consumption of e-cigarettes school property problematic for administrators? How can they prevent the usage of e-cigarettes in their schools? As e-cigarette consumption continues to grow in numbers, research must be conducted to understand its role, impact, and social construct within a North American school system.

Acknowledgment

Completing this degree has been a personal goal and achievement for me. I want to take the time to thank my parents and family for all the support they have given me throughout this educational journey. It was a personal goal of mine to challenge myself and be the best I can be academically. Growing up, I would have never thought that graduate school would be my path, but I hope my journey will serve as a testament to anyone who wants to achieve and challenge themselves to reach beyond their initial goals.

I would also like to thank all my professors who supported me throughout my educational experience as their guidance and consideration is something I will pay forward in my profession. Specifically, I would like to thank Dr. Geri Salinitri for her continued support and mentorship throughout the graduate program in the Faculty of Education here at the University of Windsor. Thank you, Dr. Finney Cherian, for taking the time to provide me with further guidance on my final paper. Working as your graduate assistant was an enriching experience, and I thank you very much for that. This is a milestone achievement for myself, and I hope I made all those who supported me proud. The reality is, none of it would have been possible without your support, thank you.

Table of Contents

Introduction

E-cigarettes are rapidly growing in popularity among teenagers in North America. Due

to its very appealing flavors, lack of stench, and can be hard to recognize to the foreign eye has

resulted in several teenagers beginning to adopt the habit. Packed with nicotine, the device has

grown in school environments due to its unique construction. Its growth in popularity among

teenagers has left many wondering why the number of teenagers using these devices is rapidly

growing year by year.

Now, the first question that must be answered is, what is an e-cigarette? Due to the

importance of these devices in relation to this knowledge synthesis, I would like to reiterate

that an e-cigarette will be defined as a:

"battery-operated device that often resembles conventional cigarettes. E-cigarettes include a

mechanism that heats fluid comprised of chemicals, flavors, and other agents contained within

a cartridge to create a vapor that is inhaled, a process often referred to as "vaping." The fluid

may contain varying amounts of nicotine, with some products containing no nicotine."

(Hamilton et al., 2014, p. 1212)

Thus, since the device consists of vapor rather than smoke, it has allowed those that use

the device to be under the impression that it is a healthier alternative to the traditional tobacco

filled cigarette. Some people have indicated that when having to pick between the two forms of

consumption, they opted for the e-cigarette because:

"there have been claims of health benefits, such as their lack of cancer-causing chemicals, the absence of first- or second-hand smoke, the fact that they will not stain teeth or damage skin, and their use as a quit aid" (Czoli, Hammond, White, 2014, p.97). One must keep this in mind when trying to understand how such a phenomenon has become popular amongst secondary school students.

When thinking about why students are bringing them into the school, one must think about what makes it possible. This is possible if a student can conceal the device very well, thus making it worthwhile risking its consumption in a school setting. Unlike the traditional cigarette that can leave a smell, set off smoke detectors, and require a lighter, part of the high consumption of an e-cigarette such as JUUL is due to its physical characteristics. The physical features of the e-cigarette have contributed to students bringing them into the school and concealing them away from staff. The brand JUUL has explicitly been noted to be the most significant contributor to concealing features of e-cigarette devices. This type of e-cigarette can be described as having a "design evoking comparisons to a computer thumb drive" (Sharfstein, 2018, p.417). This sort of physical characteristic is ideal for a school setting. This can make it very difficult for staff to identify and easy for students to conceal. Along with this, the device has been designed to have a convenience factor to it as it has no button and requires someone to inhale a puff without lighting, clicking, or triggering anything.

With the device being very similar to other school-based items such as a computer drive and having its convenient method of consuming, it can easily increase use within schools. When examining where e-cigarettes are being used, current studies have indicated that "the most common places that respondents stated they used electronic cigarettes were "everywhere"

(38%), "school bathroom" (26%), and "home" (21%). Additional responses to this question included the "school staircases" (11%) and "school cafeteria" (4%)" (Peters, Meshack, Lin, Hill, and Abugosh, 2013, p. 304). These statistics should be alarming to educational officials and can allow one to understand how such a device can shift a school dynamic.

In addition to being able to conceal the vape device, students have made it known that its popularity is due to the flavors available. It is getting so extensive that "the agency is considering adopting regulations on flavors, which are preferred by the vast majority of children and young people using tobacco products" (Sharfstein, 2018, p.418). Due to the flavors being appealing to youth, its usage among teenagers has resulted in students bringing them to schools. The more likely an adolescence is to use something, the more likely it will be brought to school, especially when it can be difficult to track or identify. Suggesting flavors and trying new ones is something that students can do with their friends while on lunch in the cafeteria or while smoking them in the washrooms.

To further demonstrate the consumption statistics of where students are using e-cigarettes, one should examine social media outlets as it has been used as a platform to demonstrate their e-cigarette consumption patterns within schools. "As vaping rapidly becomes more prevalent, social media (e.g., Twitter, Instagram, YouTube) data can be harnessed to quickly capture and describe the context in which individuals reflect on e-cigarette products and discuss the social and environmental settings in which vaping occurs" (Allem, Dharmapuri, Unger, Cruz, 2018, p.1). When searching social media platforms such as Twitter, researchers found that tags relative to JUUL resulted in "a new topic *Place of Usage* (bathroom, cafeteria, library, gym, etc.) describing where students used JUUL on school grounds" (Allem et al., 2018,

3

p.2). This is a clear indication that the phenomenon of e-cigarette consumption by teenagers is indeed a problem for current North American secondary schools.

Overall, the consumption of e-cigarettes among students is continuing to grow, making it necessary to understand its impact on a school setting. With the devices being easy to conceal and having attractive flavor selections, students can continue to use them within a school setting. Considering that an e-cigarette does not have a scent, and does not require any complicated methods to use, students are reporting that using them within schools is easy and low risk. Traditionally speaking, smoking was conducted outside of the building, and students are designated an area in which they smoked. Due to the advancements in electronic cigarettes analyzed throughout this introduction, one can understand how smoking may once again make its way back into the schools, posing a problem for staff, administrators, and school boards.

Statement of Problem

E-cigarette use by youth is a pressing concern for educators, policymakers, and health officials. As the emergence of e-cigarettes continues to work its way into the social norms of society, teenagers will continue to adopt its usage naturally. Teens are beginning to pick up the habit of smoking e-cigarettes, a practice referred by users as 'vapes' or 'vaping' at a rapid rate globally. According to Azagba (2017), "there has been an increase in the use of e-cigarettes, both among cigarette smokers and non-cigarette smokers" (p.17), and has resulted in students using them in schools. It is essential to understand at what rate consumption is growing, and most importantly, what are the contributing factors leading to e-cigarette consumption by teenagers.

Although efforts have been previously put in place to stop smoking on school property, it has been very ineffective in addressing e-cigarette consumption in schools. "The 1994 Tobacco Control Act banned smoking on school property in Ontario" (Ashley, Northrup, and Ferrence, 1998, p.224), and thus has shifted how smoking was conducted in relation to school buildings. Since the Tobacco Control Act of 1994 was enacted, students that wanted to smoke had to leave school property, or else they could risk being suspended or issued a ticket by tobacco enforcement officers. Although the government has made efforts such as the latter with the assistance of school administrators to prevent students from smoking on school property, the technological advancement of e-cigarettes discussed in the introduction has allowed students to be able to bring smoking back into the school with very low risk of getting caught.

Purpose of Statement

       The purpose of this major paper is to conduct a knowledge synthesis on the emergence

of e-cigarette consumption by North American secondary students. A knowledge synthesis is

used throughout this study. The reason behind the selection of the knowledge synthesis

derived from DeCoito (2016) is due to its structural break down of the data. Charting the data

allows for a quick and accessible way for readers to be able to analyze and extract details from

the data quickly and efficiently. DeCoito's (2016) knowledge synthesis allows for the data to be

organized and broken down in a dissected manner with details easily accessible, allowing the

reader to get an understanding of each set of research.

Research Questions

For this paper, the following questions serve as a guide for this knowledge synthesis:

Question #1: Where are teenagers using e-cigarettes? And why?

Question #2: What are some current North American policies that address smoking and vaping
      in schools?

Question #3: Why is the use of e-cigarettes on school property problematic for administrators?
How can they prevent the usage of e-cigarettes in their schools?

Locating Myself in the Study

       I identify myself as a passionate secondary school educator with two post-secondary

university degrees. My first degree was completed in 2016 at the University of Windsor with an

Honors degree in History and a double minor in Geography and Political Science. My second

degree was completed in 2018 with a bachelor's in education and International Baccalaureate

certification. As an educator in good standing with the Ontario College of Teachers and as such, abide by the ethical standards of the teaching profession; care, respect, trust, and integrity. As stated by the OCT (2018), the ethical standards for the teaching professions are:

• to inspire members to reflect and uphold the honour and dignity of the teaching profession

• to identify the ethical responsibilities and commitments in the teaching profession

• to guide ethical decisions and actions in the teaching profession

• to promote public trust and confidence in the teaching profession.

As a new teacher, I have been exposed to the current trends and phenomena happening in our Ontario secondary schools. Specifically, I have been in schools where students were seen consuming and having possession of e-cigarette devices in areas of the building, such as classrooms, washrooms, and school cafeterias. The overwhelming disciplinary issues administrators have to address weekly regarding e-cigarette consumption by students is what triggered my interest in academically researching this phenomenon.

As a secondary school teacher seeing firsthand the rapid growth of e-cigarette use and availability by secondary school students it has allowed me to understand why such a phenomenon needs to be addressed and researched. With students not understanding the health implications regarding e-cigarettes, and educators not understanding how to deal with the phenomenon, it is important to analyze the limited research based on this topic to provide a launching pad for future research.

Terminology

The following is a list of terms used throughout this knowledge synthesis:

- The term "e-cigarette" will be defined in this study as a: "battery-operated device that often resembles conventional cigarettes. E-cigarettes include a mechanism that heats fluid comprised of chemicals, flavors, and other agents contained within a cartridge to create a vapor that is inhaled, a process often referred to as "vaping." The fluid may contain varying amounts of nicotine, with some products containing no nicotine" (Hamilton et al., 2014).

- The terms "vape" and "vaping" in this knowledge synthesis will be used to describe the method of consumption of an e-cigarette by a person.

- The acronym TCA refers to the Tobacco Control Act of 1994 (Ontario Law, 1994).

- The acronym OSFA in this knowledge synthesis refers to the Ontario Smoke-Free Act 2017 (Ontario Law 2017).

- The acronym TATAMS refers to the Texas Adolescent Tobacco Advertising and Marketing Surveillance (Nicksic, 2016).

- The acronym NYTS refers to the National Youth Tobacco Survey throughout this knowledge synthesis (Singh et al., 2016).

Methodology

Knowledge Synthesis

Through a scoping study, the emergence and issues of e-cigarettes in secondary schools

has been characterized by Hamilton, Ferrence, Boak, Schwartz, Mann, O'Connor, and Adlaf as,

"high overall, with almost three out of four students reporting that they had heard of e-

cigarettes" (Hamilton et, al 2014). Through their work, they discuss the use of nicotine and

non-nicotine electronic cigarettes amongst high school students in Ontario. Arksey and

O'Malley (2005) discuss the process of a scoping study and its content. As they stated in their

work, "we now go on to describe the stages of the framework we adopted for conducting a

scoping study:

       Stage 1: identifying the research question

       Stage 2: identifying relevant studies

       Stage 3: study selection

       Stage 4: charting the data

       Stage 5: collating, summarizing and reporting the results" (p.22)

Through this framework, a synthesis was developed on the addressed topic of the emergence

and issues of E-cigarettes in North American secondary schools.

Stage 1: Identifying the Research Question

1. Where are teenagers using e-cigarettes? And why?

2. What are some current North American policies that address smoking and vaping in

   schools?

3. How is the use of e-cigarettes school property problematic for administrators? How can they prevent the usage of e-cigarettes in their schools?

Decoito's (2016) knowledge synthesis will be used to interrogate these research questions. Through this work, the knowledge synthesis will contribute to demonstrate the volume of e-cigarette usage by teenagers in secondary schools and highlight the importance of understanding its overall impact on the school environment.

Stage 2: Identifying Relevant Studies

This knowledge synthesis adapts DeCoito's (2016) four knowledge sources to capture studies relevant to the research questions:

1. Type 1 includes empirical and descriptive studies published in peer-reviewed education and policy journals.

2. Type 2 knowledge sources include empirical and descriptive studies published (including in venues other than peer-reviewed journals).

3. Type 3 sources include published expert knowledge, opinion, and/or advice (not research) located in periodicals or on websites.

4. Type 4 sources were collected through visits to various locations to meet with stakeholders (community partners, university programs, outreach, school board, etc.) (p. 117)

The following journal types were accessed to address how the issue of e-cigarettes emerged in North American secondary schools:

1) Public Health Journals

2) Nicotine and Tobacco Journals

3) Substance Abuse Journals

These journals were used to analyze and address the research questions stated above. Through these journal articles, I was able to articulate how to go about analyzing the issue of e-cigarettes emerging in North American secondary schools.

Stage 3: Study Selection

These journal articles discussed were based on the use of e-cigarettes by teenagers. These academic pieces of work are based on a North American context about the use of e-cigarettes amongst teenagers, its health implications, and its emergence in North American secondary schools. The following journals were used to address the research questions in this work:

1) The University of Texas School of Public Health

2) Centers for Disease Control and Prevention

3) Canadian Journal of Public Health

4) Canadian Medical Association Journal

5) Nicotine and Tobacco Research

6) A Multidisciplinary Journal of Population and Health and Health Policy

7) Drug and Alcohol Dependence

8) Canadian Pediatric Society

9) Journal of Ethnicity in Substance Abuse

The databases that were used to collect this research was the following:

1) The University of Windsor Library

2) JSTOR

3) ProQuest

4) Google Scholar

5) Taylor & Francis Online

6) EBSCOhost

A series of topics about the issue of e-cigarettes emerging amongst North American teenagers were researched. Throughout researching this topic, the peer-reviewed journals chosen concentrated on the following topics:

1) The use of e-cigarettes amongst middle school and high school students

2) Use and perceptions of e-cigarettes of Canadian teenagers

3) American school policies addressing e-cigarettes

4) The influence and initiation of e-cigarette smoking among teenagers

5) Ontario students use of e-cigarettes

6) Recommendations on how to address the issue of e-cigarettes

7) The use of social media by teenagers in association with e-cigarettes

8) Perceptions of e-cigarette use by male teenagers

9) Issues revolving around banning smoking on school property in Ontario

10) The potential Ontario secondary school students smoking cannabis through e-cigarettes

The following is a list of keywords and terms that were used during the research to collect literature for this synthesis:

1) E-cigarettes

2) Smoking

3) Secondary School

4) Policy

5) Vape

6) JUUL

7) Washroom

8) Concealment

9) Ontario

10) American

11) Perception

12) Classroom

As a result, 11 articles were found that can address the questions of research. The following table organizes and charts the data.

Stage 4: Charting and Organizing the Data

Title	Author(s)	Date Published	Qualitative/ Quantitative	Population	Population Size
1. Characteristics of Electronic Cigarette Use Among Middle and High School	Tushar Singh, Sara Kennedy, Kristy Marynak, Alexander Persoskie,	December 30th, 2016	Qualitative	American middle school and high school students	4,021 middle and high school students

Students — United States, 2015	Paul Melstrom, Brian A. King				
2. Electronic cigarettes in Canada: Prevalence of use and perceptions among youth and young adults	Christine D. Czoli, David Hammond and Christine M. White	April 2014	Quantitative	Youth and young adults in Canada. Ages 16-30.	1,188 youth and young adults
3. E-cigarette school policies, advertising, and use among Texas Adolescents	Nicole E. Nicksic	May 2016	Qualitative	Middle and high school students in Texas	13,600 middle and high school students
4. Electronic cigarette use and smoking initiation among youth: a longitudinal cohort study	David Hammond, Jessica L. Reid, Adam G. Cole, Scott T. Leatherdale	October 30th, 2017	Qualitative	High school students in Ontario and Alberta	19,310 high school students
5. Ever Use of Nicotine and Non-nicotine Electronic Cigarettes Among High School Students in Ontario, Canada	Hayley A. Hamilton, Roberta Ferrence, Angela Boak, Robert Schwartz, Robert E. Mann, Shawn O'Connor, Edward M. Adla	October 30th, 2014	Qualitative	High school students in Ontario	2,892 high school students
6. How Do You Solve a Problem Like Juul?	Joshua M. Sharfstein	2018	Opinion	High school students in the United States	
7.Characterizing JUUL-related posts on Twitter	Jon-Patrick Allem, Likhit Dharmapuri, Jennifer B. Ungera, Tess Boley Cruz	May 19, 2018	Quantitative	Twitter accounts	52,098 Users
8.Preventing smoking in children and adolescents: Recommendations for practice and policy	Johanne Harvey, Nicholas Chadi	May 10, 2016	Recommendation	Canadian teenagers	

9. The Social Norms and Beliefs of Teenage Male Electronic Cigarette Use	Ronald J. Peters, Angela Meshack, Mi-Ting Lin, Mandy Hill, Susan Abughosh	2013	Qualitative	Southwestern American high school students	47 high school students
10. The Ontario Ban on Smoking on School Property: Issues and Challenges in Enforcement	Mary Jane Ashley, David Northrup, Roberta Ferrence	1998	Quantitative	Ontario secondary school administrators and tobacco officers	213 Educational Administrators and 38 Tobacco enforcement officers
11. Vaporizing cannabis through e-cigarettes: Prevalence and socio-demographic correlates among Ontario high school students	George Mammen, Jürgen Rehm, Sergio Rueda	2016	Qualitative	Ontario secondary school students	3,171

Stage 5: Collating, Summarizing, and Reporting the Results

This a summary of the literature being considered for this study:

1. **Characteristics of Electronic Cigarette Use Among Middle and High School Students — United States, 2015** (Tushar Singh, Sara Kennedy, Kristy Marynak, Alexander Persoskie, Paul Melstrom, Brian A. King, 2016)

   Throughout this work, the authors analyzed data from the 2015 National Youth Tobacco

   Survey (NYTS) to examine the characteristics of e-cigarette use among U.S. middle (grades 6–8)

   and high (grades 9–12) school students in 2015, including types of products used, brands of

   products used, and whether substances other than nicotine were used with the products (p.

   1425). Through this study, popular types and brands of e-cigarettes were explained by students

   to be the ones that were used most often in the United States. Some of these brands are Blu,

NJOY, MarkTen, Logic, VUSE, Finiti, Starbuzz, and Fantasia. Of the 4,021 students who indicated

they had used an e-cigarette, 53.4% had used only rechargeable/refillable e-cigarettes.

According to the authors, "use of e-cigarettes for a substance other than nicotine was higher

among males compared with females, and non-Hispanic white and Hispanic students compared

with non-Hispanic black students" (p.1425).

2. **Electronic cigarettes in Canada: Prevalence of use and perceptions among youth and young adults** (Christine D. Czoli, David Hammond and Christine M. White, 2014)

Throughout this study, the authors aimed to provide an understanding of the prevalence

and perceptions of e-cigarettes amongst Canadian youth and young adults. An online panel of

Canadians was established in 2012. It consisted of 1,188 individuals between the ages of 16-30.

These participants were shown an image of an e-cigarette and then asked a series of questions

based on their responses regarding their use and perceptions of e-cigarettes. "Participants

were asked three questions regarding their perceptions of e-cigarettes: "Is this product harmful

to your health?", "Would you be interested in trying this product?" and "Should retail outlets,

such as corner stores and gas stations, be allowed to sell this product?" (p. 98). A series of

question was asked to the participants who were considered "ever-smokers." Other

participants were asked questions regarding their exposure to e-cigarettes, purchasing of e-

cigarettes, and experience of outcomes using the device throughout the study. The authors

concluded their work by discussing that "awareness of e-cigarettes among surveyed youth and

young adults is quite high. Almost one fifth (16.1%) of participants reported trying e-cigarettes,

with evidence of use among non-smokers" (p.97).

3. **E-CIGARETTE SCHOOL POLICIES, ADVERTISING, AND USE AMONG TEXAS ADOLESCENTS** (Nicole E. Nicksic, 2016)

This study consists of 3 different papers that revolved around "the effect of school e-cigarette policies and e-cigarette advertising on TV, radio, billboards, retail stores, internet, and an index score of all these types on e-cigarette use behaviors" (p. 1). The point of interest in this literature regarding the effect of school e-cigarette policies discusses how administrators of schools that took part in a study done by Texas Adolescent Tobacco Advertising and Marketing Surveillance (TATAMS) were interviewed regarding e-cigarette policies in their schools. Specifically, this "study utilized the school e-cigarette policies in a sample of 6th, 8th, and 10th grade students in five counties (Bexar, Dallas, Harris, Tarrant, Travis) containing the four most populated cities (Austin, Dallas/Fort Worth, Houston, San Antonio) in Texas that had participated in the Texas Adolescent Tobacco Advertising and Marketing Surveillance System (TATAMS) during the 2014-2015 school year" (p. 33). The work starts by giving background information on e-cigarette use amongst adolescents in Texas, its impact on their health, and from where the device originated. The section of interest then discusses the content of policies that were placed at these schools, how administrators went about enforcing these policies, and it investigates how the effectiveness of these policies is potentially related to students in these schools. The policies were gathered from student handbooks and school websites, as well as distributed by administrators. The study provides insight into what percentage of the 79 schools had written policies regarding e-cigarettes specifically. Some of these statistics indicate that 55 of the 79 schools had written policies regarding e-cigarettes. Also, the study concludes that "disciplinary action varied widely in both written policies and administrator interviews and included confiscation, meeting with parents, in-school

suspension, out-of-school suspension, and possible expulsion" (p.52).

4. **Electronic cigarette use and smoking initiation among youth: a longitudinal cohort study** (David Hammond, Jessica L. Reid, Adam G. Cole, Scott T. Leatherdale, 2017)

This literature is based on a longitude study done on a cohort of Canadian secondary students. The study examines "e-cigarette use and its association with cigarette-smoking initiation at one-year follow-up within a large cohort of Canadian secondary school students" (p.1328). This was done through data that was analyzed from two different COMPASS surveys by secondary school students in Alberta and Ontario. The first survey was conducted in 2013-2014, and the second one was taking place a year later. The authors "assessed cigarette smoking and e-cigarette use at baseline and follow-up using self-completed surveys" (p.1328). The authors were able to conclude through the study that there was a high correlation between cigarettes and e-cigarette use.

5. **Ever Use of Nicotine and Non-nicotine Electronic Cigarettes Among High School Students in Ontario, Canada** (Hayley A. Hamilton, Roberta Ferrence, Angela Boak, Robert Schwartz, Robert E. Mann, Shawn O'Connor, Edward M. Adla, 2014)

The purpose behind this study was to explore and examine "ever use of nicotine and non-nicotine e-cigarettes and examines the demographic and behavioral correlates of e-cigarette use in Ontario, Canada" (p.1212). 2,892 students participated in this study, and data was derived from a 2013 Ontario Student Drug Use and Health Survey. These surveys were school board and school-wide. The students completed either Form A of the survey or Form B. The Form B portion of the essay for secondary students addressed the use of e-cigarettes. "Use of e-cigarettes was assessed from the following question: 'Electronic cigarettes, or e-cigarettes, are electronic devices made in the shape of cigarettes that create an inhaled mist without

odour. Have you ever smoked at least one puff from an electronic cigarette?'" (p.1213). The authors' research indicated "that almost 15% of students had used an e-cigarette in their lifetime, compared to almost 25% of high school students who had smoked a conventional cigarette" (p.1215).

6. **How Do You Solve a Problem Like Juul?** (Joshua M. Sharfstein, 2018)

Throughout this study, the author starts by discussing the problem that a popular e-cigarette company called JUUL has contributed to the issue. He indicates that there is a potential for American teenagers in middle school and high school to get addicted to nicotine through this product. Throughout his work, he provides recommendations and suggestions as to how society can tackle the growing problem of e-cigarettes by teenagers. Some of his ideas are for companies to fund programs to educate the students on the health implications of a product like JUUL. In his work, he states, "the company is also pledging to fund for educational efforts to teach youth about the potential dangers of e-cigarette use and nicotine addiction" (p.418). Although he does not address educational institutions directly. This notion of education can be used as an example of how educational institutions can go about using their position in society to help address the growing use of e-cigarettes among teenagers in North America.

7. **Characterizing JUUL-related posts on Twitter** (Jon-Patrick Allem, Likhit Dharmapurib, Jennifer B. Ungera, Tess Boley Cruz, 2018)

The social media platform Twitter is used throughout this study by the authors to determine society's early experience with a device such as JUUL. Through a search of the term JUUL on twitter and then an analysis of what posts came up and the content of the post, the authors conducted their research. Other terms used throughout the Twitter search were characteristics

of the device such as flavour, pods, and school. The term school allowed for the researchers to

get an understanding to what age group of students were using the devices in schools

(elementary, secondary, or post-secondary), and most notably the term allowed for a sub-

section of terms that can be searched to indicate where the product was being used in schools.

This led to results such as the authors "discovered a new topic Place of Usage (bathroom,

cafeteria, library, gym, etc.) describing where students used JUUL on school grounds" (p.2). The

analysis of students tagging other students in posts and photos on Twitter also led to the notion

of understanding how and where students were using these devices. The work concludes by

providing a suggestion for schools by indicating "the JUUL vaporizer is the size and shape of a

thumb drive, and its discreetness may facilitate its use in places where vaping is prohibited.

These findings may be of importance to school administrators, teachers, prevention

programmers, and tobacco product regulators. Educators may need training on how to identify

JUUL in the classroom. School administrators may consider installing vaping detectors in

bathrooms and classrooms to deter the use of JUUL on school grounds" (p. 3).

8. **Preventing smoking in children and adolescents: Recommendations for practice and policy** (Johanne Harvey, Nicholas Chadi, 2016)

This work was put out as a form of recommendation in regarding how to go about

preventing Canadian youth from smoking tobacco and e-cigarette products. Throughout this

work, the authors discuss how the increasing use of tobacco products and e-cigarettes is a

concern to health officials. This concern is used to address the health implication such as brain

development and respiratory health among teenagers through the use of these products. The

authors then go on to discuss the different strategies that can be used to help address this

problem. Part of these suggestions revolves around what schools can do as their part in reducing or limiting the use of tobacco and e-cigarette products by teens. Specifically, the authors suggest "school-based interventions were effective in reducing long-term smoking rates, including, notably, an average 12% reduction in students who start to smoke compared with control groups" (p.7). This recommendation can be used as a point of reference regarding the role school boards should take when it comes to educating students and, most notably, ensuring their education is relevant to the current lives of students.

9. **The Social Norms and Beliefs of Teenage Male Electronic Cigarette Use** (Ronald J. Peters, Angela Meshack, Mi-Ting Lin, Mandy Hill, Susan Abughosh, 2013)

The purpose of this study was to get an understanding of the beliefs and perceived social norms regarding males smoking e-cigarettes. This study conducted in a high school in the southwestern United States and was based on 47 teenage boys that indicated they were frequent users of e-cigarettes. Questions that were part of this study were, "Where are places that you use electronic cigarettes? What do your friends think about electronic cigarettes? and Why are electronic cigarettes so popular?" (p.304). Through this, the authors were able to establish an understanding of what the male social norms and beliefs were among male e-cigarette users. The study concludes by indicating that "when asked why they believe young people their age use electronic cigarettes, the majority (40%) of respondents felt that 'expeditious consumption and concealment' were the primary reasons. However, 'high social approval' (26%), 'healthier than cigarettes' (19%), and 'odorless' (15%) were other prevalently suggested reasons for use" (p.304).

10. **The Ontario Ban on Smoking on School Property: Issues and Challenges in Enforcement** (Mary Jane Ashley, David Northrup, Roberta Ferrence, 1998)

This study examined and documented the implementation and enforcement of smoking

policies by high schools in Ontario. This article does not pull to a focus of e-cigarettes but

instead discusses the 1994 policy known as the Tobacco Control Act, which banned smoking on

school property in Ontario. Interviews were conducted via telephone in 1996, and

administrators were asked a series of questions about the enforcement and implementation of

such policies. The research discusses how part of the implementation and enforcement of the

policy consisted of tobacco control officers showing up to the schools and giving students

tickets for smoking on school property. The work also discusses how "Eighty-three percent of

schools had suspended students for contravening the ban" (p.230). The work also presents the

challenges that arose from implementing the policy. The study indicates that health officials

had a difficult time discussing the health implications due to the student being uncooperative.

Suggestions given by administrators included educating parents on the matter to assist in the

enforcement of the policy. The study concludes by discussing that back in 1998, "both schools

and tobacco enforcement officers feel they do not have the resources required to enforce the

ban and deal effectively with the unintended consequences of it" (p.232). Now, although this

study does not address the issue of e-cigarettes, it is important to understand that it still serves

a particular purpose for my research. This work provides a historical understanding regarding

smoking on school property, a key element of e-cigarettes. This work will provide a foundation

and historical background in understanding what challenges might arise when implementing

policy, also to indicate the similar enforcement tactics still being used in reference to tobacco

officers attending the schools and suspensions occurring. Most notably, it provides a clear

understanding that the policies mentioned in this studied were once useful for the traditional

cigarette but have failed to address or plan for the introduction of e-cigarettes and their concealed characteristics.

11. Vaporizing cannabis through e-cigarettes: Prevalence and socio-demographic correlates among Ontario high school students (George Mammen, Jürgen Rehm, Sergio Rueda, 2016)

The authors of this study looked to understand the prevalence of adolescents smoking cannabis through e-cigarettes. The study uses data from the Ontario Drug Use and Health Survey and indicates that in 2015, the survey consisted of questions regarding vaporizer cannabis consumption. The work discusses how "students in grades 9–12 (ages 15–18) were asked if they used e-cigarettes in the previous 12 months for marijuana, hash oil, liquid, or wax. This study presents vaporizer use data from a random half sample (split form) of 3,171 high school students, in addition to data on socio-demographic correlates, including sex, age, race, immigrant, and socio-economic status" (p.337). The results of the study indicated that 8% of students indicated using cannabis through e-cigarettes and discusses that e-cigarettes can be a way of students consuming cannabis products in school as the device's popularity continues to grow. Although this work primarily discusses the use of cannabis through e-cigarettes by adolescents, it can be used as a vital point of my work to demonstrate the importance of looking ahead when implementing policy. That school board and administrators should not only address the use of e-cigarettes aggressively, but they should also prepare for the potential introduction and evolvement of cannabis being smoked in their schools through e-cigarettes. It can provide an understanding of what more e-cigarettes in schools can potentially cause.

Research Analysis

The eleven articles chosen for this knowledge synthesis shared common themes. The following will be a discussion on the universal themes shared between these studies, which are relevant to the research topic of this major paper.

Theme 1: E-cigarette Usage in Schools

The theme that is shared by Czoli et al. (2014), Hamilton et al. (2014), Hammond et al. (2017), and Peters et al. (2013) is how e-cigarette use is present within the North American educational institutions. The work by these others allows their work to provide a common analysis as to how e-cigarette use by teenagers correlates with students. As the authors discuss the role of schools in correlation to e-cigarette consumption, "most common places that respondents stated they used electronic cigarettes were "everywhere" (38%), "school bathroom" (26%), and "home" (21%). Additional responses to this question included the "school staircases" (11%) and "school cafeteria" (4%)" (Peters et al., 2013, p. 304). The theme of the e-cigarette consumption in a school setting is vital to understanding how e-cigarette consumption has rapidly grown among teenagers and how other correlations to the consumption of the product could be made. This correlation provides authors the groundwork to understand where students are using the device, and further understand what other associations can be made to e-cigarette consumption.

Further associations that were correlated based on this theme revolved around the perceptions of e-cigarettes by youth. A specific perception by youth was noted as, "many users believe e-cigarettes to be healthier than regular cigarettes and report using them for this reason" (Czoli et al., 2014, p.97). As authors begin to correlate the consumption of e-cigarettes

24

to a school setting, they start to correlation other elements of e-cigarette consumption, such as the latter.

The role of the school is something all these authors have in common throughout their work. As research continues to develop on this new phenomenon, the role of the education system will continue to be a topic of discussion and analysis. This is primarily due to the foundational findings resulting in student disclosure of where they are using e-cigarettes. The rapid growth of consumption of e-cigarettes by students discussed by these authors allows for future research to contribute to this the question of how e-cigarette consumption possibly impacts school as a whole.

Theme 2: Popular E-cigarette Brands Used by Teenagers

As e-cigarettes have continued to grow in usage by teenagers rapidly, many have begun to examine which brands are most popular and why. This theme is shard in the work of Singh et al. (2016), Sharfstein (2018), and Allem et al. (2018). Through this theme, all three research articles look to discuss what teenagers are using brands of e-cigarettes, and why this may be the case. The concept of concealment is also a common discussion throughout their work as they discuss how students are choosing devices that can easily be misinterpreted if found. JUUL is a brand two articles specifically focus on and provide a discussion regarding how "the JUUL vaporizer is the size and shape of a thumb drive, and its discreetness may facilitate its use in places where vaping is prohibited" (J.-P. Allem et al., 2018, p.3). The notion of understanding what makes particular brands popular amongst youth is a commonality throughout all three literary works. A focus on the flavouring of e-cigarettes and how to conquer its impact is

another dimension derived from this theme. Research has indicated how it is used by brands as a feature to lure youth to purchase their devices. Academics have suggested to "change the product, take out the attractive flavors, tone down the edgy marketing and the social media explosion will die down" (Sharfstein, 2018, p.419). With specific brands using such methods to make their products more attractive to consumers, it is ultimately luring teenagers.

The specific features regarding concealment, flavoring, and accessibility are all topics shared throughout these articles to understand why certain brands are more popular amongst youth and teenagers. This theme lends itself to look at specific components of e-cigarette brands such as flavoring, which could provide the grounds for future government regulation of the products. Such government regulation is vital to limiting brands popularity among teenagers.

Theme 3: Smoking Policy Recommendations

With e-cigarette consumption being a new phenomenon within schools, it is something education policymakers are trying to figure out how to combat. As the phenomenon continues to grow at a rapid rate, policymakers are continually thinking of alternative methods to try and address this issue being present in schools. This theme of smoking policy recommendations is discussed and shared throughout the work of Nicksic (2016), Harvey (2016), and Ashley et al. (1998). The work of Nicksic (2016) and Chadi and Harvey (2016) discuss methods in which this phenomenon can be addressed, while Ashley et al. (1998) provide insight into what can be problematic when enforcing policy relevant to smoking in schools. One way the theme of smoking policy recommendations is analyzed is through the examination "to assess how much

school administrators knew about the written policy and whether additional components not noted in the written policy were present and being enforced, respectively" (Nicksic, 2016, p.37). Understanding the written policies about e-cigarettes was one method discussed in academic work to address e-cigarette consumption in the state of Texas. But most importantly, academics wanted to examine how much administrators knew about these policies and whether they were being enforced. This would prove to be the decisive factor regarding the impact of the policies in a school setting.

Chadi and Harvey (2016) discuss the same theme but from a different perspective. His work recommends that in addition to the no-smoking policies enforced by school administrators, there should also be regulations that require schools to "offer regular programs to screen and counsel for smoking cessation" (Chadi and Harvey, 2016, p.7). Although this is only a recommendation, policies that require schools to have such programs could provide an alternative method to address the issue. Such policies would allow for a different approach for students to learn about what they are doing about themselves and seeking the right support. It is important to consider the methods of approach when enforcing policies as there can several different approaches. Ashley et al. (1998) discuss this in her work as she suggests some ways smoking in schools can be addressed or reduced. "These included increased educational efforts that involved parents as well as students and teachers and increased educational efforts to enforce existing rules about smoking" (Ashley et al. 1998, p.231). Such methods can be used to assist in addressing the growing problem of e-cigarette consumption in schools. Understanding the importance of policy and ensuring that administrators are aware can assist in the success of the policy.

Gap Analysis – Additional Research

Through understanding how much e-cigarette consumption has grown amongst teenagers in North America, it is important to understand further the social context associated with e-cigarette consumption, as well as the long-term impacts. Due to the phenomenon being so new and current, much research not been emphasized on the "significant associations between perceived addictiveness and social acceptance of the products" (Dobbs, Hammig, & Henry, 2017, p.294). Additional research is recommended to explore and examine the relationship between the social context of smoking e-cigarettes amongst youth in North America and whether or not that is apparent through a school setting. This can allow school administrators along with education policymakers, to understand which methods are best to approach this phenomenon.

Along with understanding the social context associated with the consumption of e-cigarettes by teenagers in schools, it is important to understand what the impact can be long term. This is about health as well as whether smoking-cigarettes could lead to the vaporizing of other products. Since this phenomenon is new, much of the current research is limited in a time frame. For example, since there is minimal extensive research conducted to see the full impact of e-cigarettes, "long-term health risks of e-cigarette use are not yet known" (Shiplo, Czoli, & Hammond, 2015, p.1). Further long-term studies are required to further examine the health implications of e-cigarettes.

Along with the concern of health implications, "the influence of e-cigarette use on smoking initiation is a highly controversial issue, with limited longitudinal data available for examining

temporal associations" (Hammond et al., 2017, p.1328). Such research has been suggested to help prevent the influence of vaporizing all forms of smoking, including cannabis among teenagers. Longitudinal research in the potential influence of e-cigarettes will allow school administrators, health officials, and policymakers to "to better monitor the prevalence of vaporized cannabis use in adolescents" (Mammen et al., 2016, p. 338). It is important to understand that researching the influence of e-cigarettes "should account for all vaporizer designs" (Mammen et al., 2016, p. 338).

 Considering that the consumption of e-cigarettes by teenagers in North America is a new phenomenon, there is indeed a gap in research that requires attention. This attention and future research should be geared towards the understanding of a potential social context associated with teenagers consuming the device very rapidly, and the long-term influence and health implications of the product. Understanding what the consumption of vaporized e-cigarettes can lead to, along with how it can be harmful to a person, will allow educators health officials, and policymakers have a further understanding on how to approach this current phenomenon.

Limitations

 As this knowledge synthesis was geared towards examining the research relative to e-cigarette use by teenagers, as with all theoretical frameworks, it is not without limitations. As a new social phenomenon, "teen-vaping" peer-reviewed journals and academic work was sparse. Qualitative data finding dissemination remains limited. Another persistent limitation was accessing research relevant to the policy and social context of schools. The abundance of

current research is based on a discussion of health and examining whether or not e-cigarette could one day be harmful.

Discussion

After a knowledge synthesis of eleven peer-reviewed articles, common themes and analyses were evident. The following is a discussion on the initial guiding questions:

1. Where are teenagers using e-cigarettes? And why?

2. What are some current North American policies that address smoking and vaping in schools?

3. Why is the use of e-cigarettes on school property problematic for administrators? How can they prevent the usage of e-cigarettes in their schools?

E-cigarette consumption in North America has been growing at a rapid rate. What has been most alarming in North America is the level of consumption by teenagers. Czoli et al. (2014), Hamilton et al. (2014), Hammond et al. (2017), and Peters et al. (2013) all discuss how teenagers have taken their consumption habits into their schools. This is something that many begin to wonder how it is possible and why students are using these devices in schools. It is important to understand the physical characteristics of an e-cigarette when considering why students are bringing them into the schools. Specifically speaking, "the Juul electronic nicotine delivery device became popular among youth because it's small and easy to conceal. It has a techy allure, resembling a USB stick, and offers flavours like mango and vanilla" (Glauser. 2019, p.1). When it becomes easy to conceal something, the risk factor is minimalized and therefore makes it more likely that student will break the school rules by consuming the device in "school

bathrooms, at home, and in school staircases" (Peters et al., 2013, p. 305). This leads to a

discussion understanding of what more schools and policymakers can do to prevent or limit the

use of e-cigarettes within school buildings.

This knowledge synthesis provides insight regarding where students are using e-cigarette

devices and why they are doing so. The fact that students can conceal the products makes it

very possible for students to bring it into the schools. However, although this may be occurring,

it does not translate into what school policies enforce or mandate.

Currently, in Canada and the United States, the policy regarding smoking in schools is

that "smoking on school property is not allowed" (Ashley et al., 1998, p.224). It is important to

understand how policymakers, as well as educators, have gone about enforcing such a rule and

how it may not have been successful in addressing e-cigarettes. The policies that addressed the

emergence of the traditional cigarette on school property in Ontario in the mid-1990's are the

ones being used to treat today's e-cigarette phenomenon. This portion of the discussion will

provide insight regarding these policies as they are still the policies in place addressing smoking

on school property today. This will be done through an analysis of the 1994 Tobacco Control Act

(TCA). Along with the objective of this policy, this discussion provides policy implementation

and enforcement by school administrators and tobacco enforcement officers throughout the

province.

When the consumption of the traditional cigarette began to gain popularity among

teenagers in Ontario, the government started to construct policies regarding how to go about

keeping smoking off school property. As students began to consume the traditional cigarette on

school property, policies began to make their way to prevent the latter. This policy was the TCA

in 1994. The *Tobacco Control Act* (1994) indicated that "no person shall smoke tobacco or hold

lighted tobacco in any of the following places: A school as defined in the *Education Act*."

(Tobacco Control Act, 1994). Although students still could choose to try and smoke a traditional

cigarette in school, it was very risky due to its characteristics of the strong scent, requirement

of a lighter, and residue of ashes it left behind. Administrators began to enforce these policies

within their building, along with the support of government officials. The research of Ashley et

al. (1998) indicates that "eighty-three percent of schools suspended students for contravening

the ban" (p.230).

Along with administrators, tobacco enforcement officers have also played a role in

implementing and enforcing the policy. "School administrators thought that both the school

and the enforcement officers had roles to play in enforcing the ban" (Ashley et al., 1998, p.229).

Through this collaborative work, it was left to the enforcement officer to issue a ticket if a

student was caught smoking. Ashley et al., (1998) discusses how "schools reported that tobacco

enforcement officer had ticketed students for smoking on school property" (p.230). Through

this, one can note how smoking on school property was an issue in the 1990s that had to be

addressed. Through the introduction of this policy, smoking on school property was no longer

allowed. The implementation of these policies is what contributed to removing smoking from

schools up until recently with the introduction of e-cigarettes.

Today we see the same policy enforcement through the Ontario Smoke-Free Act (OSFA)

2017. One of the differences between the TSA (1994) and the OSFA (2017) is the inclusion of

vaping. Just like the TSA (1994), the Ontario Smoke Free-Act (2017) prohibits smoking (which

includes vaping) anywhere that is defined as "a school within the meaning of the *Education Act*." This is important to understand as it emphasizes the vitality of policy revision. If vaping inside schools were not such a vital concern, then policymakers would not have to revise policies to address a phenomenon. The inclusion of terms such as e-cigarettes and vaping in North American policies emphasize the vital concern of students consuming e-cigarettes in schools.

As e-cigarettes consumption in North American schools continues to grow, it is only a matter of time before the school administrator needs to start addressing it. Although there are provincial policies in place to assist in preventing the consumption of e-cigarette's in schools, the phenomenon is still problematic for a school administrator as it is happening in their building. The reason e-cigarette consumption inside school buildings is problematic for an administrator is since traditionally speaking; smoking was conducted outside of the school. Smoking was taken "from a designated area on school property determined by the school, to a public area off school property selected by students" (Ashley et al., 1998, p.225). The students that wanted to smoke created a designated area for themselves off school grounds. When this happened with the traditional cigarette, it allowed administrators from not having to worry about it in the school as students took it upon themselves to create a spot to smoke off school property. This naturally decreased the number of students considering smoking in school. Students did not want to put themselves at risk, given that they have a spot off school property to smoke a cigarette. Although students who smoke e-cigarettes have the same option today, many don't use it considering the risk of getting caught smoking an e-cigarette is less likely due to its concealment features discussed throughout this knowledge synthesis.

Considering the low-risk of students being caught vaping due to the concealment features of e-cigarettes, acknowledging the potential of smoking being re-introduced into school buildings became "of importance to school administrators, teachers, prevention programmers, and tobacco product regulators" (Allem et al., 2018, p.3). Rather than worrying about other components of the school and keeping their focus on administering the learning of students, school administrators are now having to deal with students smoking within the school. For example, school administrators have to keep an eye out on simple actions such as a student taking frequent or extended washroom breaks as research in this knowledge synthesis indicates where many students use the devices in schools. Now, although this can assist in monitoring the issue of students consuming e-cigarettes within the school, it does not prevent it. Thus, this results in having administrators address this problem through preventative measures.

The question then becomes, could an administrator go about tracking and preventing something that has a concealing characteristic, minimal scent, and can be consumed without a lighter or any preparation? If the device looks like a USB hard drive, how can you be sure it is a cigarette? If a device can be consumed in a blink of an eye, how do you watch for it? How can you sniff for something that has a minimal scent? This leads to understanding what administrators can do to assist in preventing the consumption of e-cigarettes in schools. Some have suggested that "school administrators may consider installing vaping detectors in bathrooms and classrooms" (J.-P. Allem et al., 2018, p.3). Such detectors can go about catching things the natural human cannot, the same way school cameras always do – keeping an eye on

things no matter what time of day. This, in turn, can prevent students from wanting to smoke it in the building as now the risk factor is amplified.

Another method that administrators can use to prevent the use of e-cigarettes within their schools is by providing training to their staff. This form of training can consist of providing staff with an understanding of popular brands, the most common models, and how they are used. This can allow teachers to develop an understanding of detecting the use of an e-cigarette in the classroom or hallway. It is difficult to detect something that you are not knowledgeable about. Therefore, "educators may need training on how to identify JUUL in the classroom" (Allem et al., 2018, p.3). This can potentially lead to students understanding that the device is not as discrete as they thought and will refrain from using it in the school. Although these are methods school administrators can use to prevent e-cigarettes from being used in a school, it is not a guarantee that it is going to stop it completely.

It is also important to understand that the consumption of vaporized products such as e-cigarettes can be problematic for school administrators as research has indicated how consumption of vaporized products can potentially lead to the vaporized consumption of cannabis. It has been noted that "one often-ignored factor influencing cannabis use, however, relates to the method of consumption. Vaporizing cannabis is a growing delivery method and warrants attention" (Mammen et al., 2016, p. 337). Therefore school administrators must address the consumption of vaporized products such as e-cigarettes to prevent this consumption method from being used for cannabis in a school building. If the vaporizing of nicotine in schools can be addressed and prevented by school officials and administrators, then naturally, the risk of vaporized cannabis consumption will be less likely to occur.

The underlying discussion here is that the introduction of e-cigarettes in the school has become problematic for school administrators and has resulted in them having to take preventive measures to minimize the consumption rate of e-cigarettes within their schools.

The introduction of e-cigarettes in North American schools has provided a new dynamic to the role of a school building for teenagers. As students continue to use e-cigarettes, it is only a matter of time before they bring them to school. Understanding why students bring them to school, what policies surrounding smoking in schools, and how this phenomenon has become problematic for administrators are all questions addressed throughout this discussion.

Conclusion

E-cigarette use (aka vaping) by North American teenagers continues to grow at a rapid rate; schools will always have a problem. While companies are making an extensive amount of profit from sales, one can only begin to think about the role of corporate profit concerning the exploitation of youth. Policy makers and school administrators must keep a vigilant eye out for the latest and trends and models when it comes to e-cigarettes as it can end up in their schools. With current government involvement, the hope is that e-cigarette sales and marketing will be regulated to minimize the appealing factor to teenagers. As we continue to experience this new age of smoking, educators must begin to learn more about e-cigarettes to assist in preventing its consumption in school buildings and classrooms. With the creation of concealing devices, it is important to be able to identify and address these devices.

The use of e-cigarettes among students and youth are continuing to grow, and it is important to understand its impact on a school setting. With the devices being easy to conceal

and have attractive flavor selections, students can continue to use them within schools. Considering that an e-cigarette does not have a scent, and does not require any complicated methods to use, students are reporting that using them within schools is easy and low risk. Traditionally speaking, smoking was conducted outside of the building, and students are designated areas in which they smoked. Due to the advancements in electronic cigarettes analyzed throughout this knowledge synthesis, one can understand how smoking may once again make its way back into the schools, posing a problem for staff, administrators, and school boards.

References

Allem, J.-P., Dharmapuri, L., Unger, J. B., & Cruz, T. B. (2018). Characterizing JUUL-related posts on Twitter. *Drug & Alcohol Dependence*, *190*, 1–5. https://doi.org/10.1016/j.drugalcdep.2018.05.018

Arksey, H., & O'Malley, L. (2005). Scoping studies: towards a methodological framework. *International journal of social research methodology*, *8*(1), 19-32.

Ashley, M. J., Northrup, D. A., & Ferrence, R. (1998). The ontario ban on smoking on school property: Issues and challenges in enforcement. *Canadian Journal of Public Health, 89*(4), 229-32. Retrieved from https://search-proquest-com.ledproxy2.uwindsor.ca/docview/232010001?accountid=14789

Azagba, S., Baskerville, N. B., & Foley, K. (2017). Susceptibility to cigarette smoking among middle and high school e-cigarette users in Canada. Preventive Medicine, 103, 14–19. Retrieved from https://doi.org/10.1016/j.ypmed.2017.07.017

Czoli, C. D., B.Sc, Hammond, D., PhD., & White, C. M., M.Sc. (2014). Electronic cigarettes in canada: Prevalence of use and perceptions among youth and young adults. *Canadian Journal of Public Health, 105*(2), e97-e102. Retrieved from https://search-proquest com.ledproxy2.uwindsor.ca/docview/1535966109?accountid=14789

DeCoito, I. (2016). STEM education in Canada: A knowledge synthesis. *Canadian Journal of Science, Mathematics and Technology Education*, *16*(2), 114-128.

Dobbs, P. D., Hammig, B., & Henry, L. J. (2017). E-cigarette use among US adolescents: Perceptions of relative addiction and harm. *Health Education Journal*, *76*(3), 293–301. https://doi.org/10.1177/0017896916671762

Glauser, W. (2019). New vaping products with techy allure exploding in popularity among youth: CMAJ CMAJ. *Canadian Medical Association.Journal, 191*(6), E172-E173. doi:http://dx.doi.org.ledproxy2.uwindsor.ca/10.1503/cmaj.109-5710

Hamilton, H. A., Ferrence, R., Boak, A., Schwartz, R., Mann, R. E., O'Connor, S., & Adlaf, E. M. (2015). Ever use of nicotine and nonnicotine electronic cigarettes among high school students in ontario, canada. *Nicotine & Tobacco Research : Official Journal of the Society for Research on Nicotine and Tobacco, 17*(10), 1212-1218. doi:http://dx.doi.org.ledproxy2.uwindsor.ca/10.1093/ntr/ntu234

Hammond, D.M., Reid, J.L., Cole, A.G., & Leatherdale, S.T. (2017). Electronic cigarette use and smoking initiation among youth: a longitudinal cohort study. *CMAJ : Canadian Medical Association journal = journal de l'Association medicale canadienne, 189 43*, E1328-E1336

Harvey, J., & Chadi, N. (2016). Preventing smoking in children and adolescents: Recommendations for practice and policy. *Paediatrics & Child Health, 21*(4), 1-9. Retrieved from https://search-proquest-com.ledproxy2.uwindsor.ca/docview/1791292208?accountid=14789

Mammen G, Rehm J, Rueda S. Vaporizing cannabis through e-cigarettes: prevalence and socio-

demographic correlates among Ontario high school students. Can J Public Health.

2016;107(3):e337-e338. doi:10.17269/cjph .107.5747

Nicksic, N. E. (2016). E-cigarette school policies, advertising, and use among Texas

adolescents (Order No. 10126233). Available from ProQuest Dissertations & Theses

Global. (1797588607). Retrieved from https://search-proquest-

com.ledproxy2.uwindsor.ca/docview/1797588607?accountid=14789

Ontario Law, (2017). *Smoke-Free Ontario Act*. Available at

https://www.ontario.ca/laws/statute/17s26#BK16

Ontario Law, (1994). *Tobacco Control Act*. Available at

https://www.ontario.ca/laws/statute/94t10/v1

Peters, R. J., Meshack, A., Lin, M.-T., Hill, M., & Abughosh, S. (2013). The Social Norms and

Beliefs of Teenage Male Electronic Cigarette Use. *Journal of Ethnicity in Substance

Abuse*, *12*(4), 300–307. https://doi.org/10.1080/15332640.2013.819310

SHARFSTEIN, J. O. S. H. U. A. M. (2018). How Do You Solve a Problem Like Juul? *Milbank

Quarterly*, *96*(3), 417–420. https://doi.org/10.1111/1468-0009.12334

Shiplo S, Czoli CD, Hammond D E-cigarette use in Canada: prevalence and

patterns of use in a regulated market *BMJ

Open* 2015;**5:**e007971. doi: 10.1136/bmjopen-2015-007971

Singh T, Kennedy S, Marynak K, Persoskie A, Melstrom P, King BA. Characteristics of Electronic Cigarette Use Among Middle and High School Students — United States, 2015. MMWR Morb Mortal Wkly Rep 2016;65:1425–1429.

DOI: http://dx.doi.org/10.15585/mmwr.mm655051a2External.

Vita Auctoris

NAME: Abdul Merhi

PLACE OF BIRTH: Windsor, ON, Canada

YEAR OF BIRTH: 1993

EDUCATION: University of Windsor, B.A Hons, Windsor, ON, 2016

University of Windsor, B.Ed., Windsor, ON, 2018

University of Windsor, M.Ed., Windsor, ON, 2019