

**FEASIBILITY AND ACCEPTABILITY OF POINT-OF-CARE HIV  
SCREENING IN COMMUNITY-BASED DENTAL CARE SETTINGS**

An Undergraduate Research Scholars Thesis

by

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## **ABSTRACT**

### **Feasibility and Acceptability of Point-of-Care HIV Screening in Community-based Dental Care Settings**

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The dental setting is a largely untapped venue to identify patients with undiagnosed Human Immunodeficiency Virus (HIV) infection. Yet, uptake of rapid HIV testing within the community-based dental care settings remains low. This study seeks to better understand the community-based education experiences of dental students and how these experiences might influence their willingness to promote point-of-care HIV screening in community-based dental care settings in the future. The overall objective of this feasibility study is to survey and analyze data of dental students in order to develop an HIV prevention health education program that will increase their knowledge about HIV/Acquired Immune Deficiency Syndrome (AIDS) and promote positive attitudes about point-of-care HIV screening, which will include the following for patients who test positive: ordering the appropriate confirmatory lab tests and linking patients to HIV care providers. A systematic intervention development process will be used to help increase the proportion of dentists willing to treat underserved populations. Key stakeholders (dental faculty and students) will be engaged in the intervention development

process. Between January and March 2019, we conducted a needs assessment survey to inform the systematic intervention development process. A broad literature review over the scope of this project was obtained with the following search strategy: (dental care OR dentist& OR dental office\*) AND (underserved OR underserved population\* OR population\*) AND (HIV OR human immunodeficiency virus). Participants (n=147) were 51% females with median age (years):  $25.9 \pm 3.03$  SD. There was no significant difference observed for means of HIV/AIDS related knowledge levels and community-based dental education (CBDE) working experience with each of the following groups: low income, homeless, injection drug users and people living with HIV (PLWH). Pre-CBDE experience working with a group did not have an impact on their anticipated comfort level in working with the respective group during CBDE. At least 93% reported willingness to treat the population groups discussed above after graduation. Dental schools have a great impact on their student's decisions post-graduation to provide care for different underserved populations. Health care students who are exposed to underserved populations in clinical settings are more willing and have positive attitudes towards treating such populations.

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Finally, thank you to my immediate and extended family for their overwhelming encouragement and support. The friendship, hospitality, and wisdom gained by their presence has helped guide me to what I hope to accomplish in the future.

## NOMENCLATURE

AIDS	Acquired Immune Deficiency Syndrome
CBDE	Community Based Dental Education
HIV	Human Immunodeficiency Virus
PLWH	People Living With HIV
SD	Standard Deviation

# CHAPTER I

## INTRODUCTION

For an overwhelming portion of the United States population, access to dental care is a challenge (Kuthy, McQuistan, Heller, Riniker-Pins & Qian, 2010). There are many factors associated with a patient's ability to receive dental treatment. Some include financial status, geographic location, and willingness of dentists to treat individuals with certain characteristics, such as HIV (McQuistan, Heller, Qian & Riniker, 2010). Oral health conditions associated with human immunodeficiency virus (HIV) are typically more severe and complicated than treating such conditions without HIV (Heslin, Cunningham, Marcus, Coulter, Freed & Der-Matrosian, 2001). Some estimates argue that 90% of HIV patients will obtain at least one oral manifestation throughout the course of their disease (Heslin, Cunningham, Marcus, Coulter, Freed & Der-Matrosian, 2001). These oral manifestations are important to catch among HIV positive patients because a decline in oral health conditions frequently correlates to a decline in immune function (McQuistan, Heller, Qian & Riniker, 2010). Both medical and dental services roles in managing HIV have become increasingly important to prevent a life-threatening infection (Heslin, Cunningham, Marcus, Coulter, Freed & Der-Matrosian, 2001). This being said, health care providers' perceived comfort and attitudes in treating such patients is noted as contributing to HIV patients access problem to dental care (Kuthy, McQuistan, Heller, Riniker-Pins & Qian, 2010). This is largely due to dentists feeling inadequately trained to treat patients under certain circumstances (Kuthy, McQuistan, Heller, Riniker-Pins & Qian, 2010). Health care students who are exposed to underserved populations in clinical settings are more willing and have positive attitudes towards treating such populations (McQuistan, Heller, Qian & Riniker, 2008). This was

due to many factors, one of which was an increase in students' confidence and perceived competence in treating different underserved populations (McQuistan, Heller, Qian & Riniker, 2008).

Without accessible dental care, dental conditions of patients can be at risk of life-threatening infections. For example, this is particularly problematic for individuals previously institutionalized due to intellectual and developmental disabilities who formerly had health care provided for them at their participating facility (Kuthy, McQuistan, Heller, Riniker-Pins & Qian, 2010). Many studies have been created regarding dental students' attitudes of HIV patients, but a limited number of data exists pertaining to dentists' comfort levels in treating these patients (McQuistan, Heller, Qian & Riniker, 2008). By better understanding why dentists are unlikely to serve the HIV population, other healthcare providers may be able to find other providers who would be willing to treat such patients (McQuistan, Heller, Qian & Riniker, 2010). In addition, providing dental students opportunities to interact with HIV positive patients may help minimize the access problems currently seen in dental office populations.

Early stages of HIV show a decrease in immune system functionality from their oral condition. Certain populations are notable for have an inequity in oral health care status, including member of ethnic and racial minority groups, low-income households, and medically compromised or disabled individuals (Heslin, Cunningham, Marcus, Coulter, Freed & Der-Matrosian, 2001). A possible reason attributing to these groups exhibiting poor oral health care conditions include their preference of obtaining care from a member of their own ethnic or racial group.

Dental schools have a great impact on their student's decisions post-graduation to provide care for different underserved populations (McQuistan, Heller, Qian & Riniker, 2010). Students



who believe their education has prepared them to provide care to such populations have been found to have positive attitudes and behaviors towards their treatment (McQuistan, Heller, Qian & Riniker, 2010). This has led to dental schools increasing their student's exposure to underserved populations during rotations, didactic courses, and community-based learning experiences (McQuistan, Heller, Qian & Riniker, 2010). However, these experiences vary amongst different institutions (Kuthy, McQuistan, Heller, Riniker-Pins & Qian, 2010). Such underserved populations include special health care needs patients, low-income patients, elderly patients, and the homeless (McQuistan, Heller, Qian & Riniker, 2010).

Overall, workforce knowledge, attitudes, and intentions in regards to vulnerable populations can have a great effect on the oral health care of at-risk populations (Hamershock, Rajabiun, Fox, Mofidi, Abel & York, 2014). A plethora of studies have shown that both those who have obtained a career in the oral health field or those currently working on doing so may have a lack of knowledge or negative attitude towards treating these populations (Hamershock, Rajabiun, Fox, Mofidi, Abel & York, 2014). That being said, studies have also shown that these attitudes can be influenced with appropriate and adequate training. In addition, those with personal relationships with at-risk populations, including family members and close friends, tends to show a more positive attitude towards treating such populations (Hamershock, Rajabiun, Fox, Mofidi, Abel & York, 2014).

This thesis was written to describe the results of a study conducted at Texas A&M University pertaining to the knowledge accumulated through different aspects of the literature review described above. The main objective of this study was to determine what factors, those included in other studies and those not, that contribute to a dental student's decision on treating at risk populations post-graduation.

To begin research, a search strategy was implemented in order to obtain relevant research to the topic of this thesis. The following search strategy was used to obtain articles relevant to this study: (dental care OR dentist& OR dental office\*) AND (underserved OR underserved population\* OR population\*) AND (HIV OR human immunodeficiency virus).

The search strategy was used in the databases PubMed, CINAHL COMPLETE, and Web of Science. The inclusion criteria for articles in response to the title included 1) The article was written in English and 2) The title mentioned dental students and some form of treatment. The search strategy in PubMed yielded nine results. Of these, eight were included after screening the title based on the inclusion criteria described above. Seven of these articles were included after screening the abstract. One article was removed due to the content not being related to underserved populations. The search strategy in CINAHL COMPLETE yielded two results. Of these, one was included after screening the title based on the inclusion criteria described above. Zero articles were removed after reading the abstract. The search strategy in Web of Science yielded six results. Of these, five were included after screening the title based on the inclusion criteria described above. Zero articles were removed after reading the abstract. A total of seven articles were available for literature review after accounting for duplications of articles between databases. This allowed for an in-depth background and understanding of the scope of this topic to be obtained. This information can be found in Appendix A in the Appendix for a detailed and visual of how the articles were obtained. Table 1 below shows a PICO analysis used to help develop a search strategy in order to obtain the literature review.

Table 1: PICO Analysis

<b>PICO</b>	<b>Subject</b>	<b>Element</b>	<b>Search Terms</b>
<b>P</b>	Patient, Population, Problem	At-risk populations	(underserved OR underserved population* OR population*) AND (HIV OR human immunodeficiency virus)
<b>I</b>	Intervention, Prognostic Factor, or Exposure	Dental students' outlook on treating at-risk populations	(dental care OR dentist& OR dental office*)
<b>C</b>	Comparison	Factors determining dental students' outlook on treating at-risk populations	Found in above search strategy
<b>O</b>	Outcome- What to measure/achieve	How to have greater population of dentists/dental students treating at-risk populations	Found in above search strategy

IRB approval was officially obtained on January 3<sup>rd</sup>, 2019. This allowed our team to

begin taking additional steps in the progress of this project.

## CHAPTER II

### METHODS

Information on all dental schools in the United States were obtained in order to contact students to participate in our survey. The information gathered on each dental school included, but was not limited to, the availability of a community-based clinic, the dental school's address, contact information, MSA/MD name, US Census Region, and US Census Division. Dental schools were contacted based on whether an email address was provided on their school's main site. Dental schools were contacted via email the week of January 14<sup>th</sup>, 2019. Of the 66 dental schools in the United States, 13 schools agreed to participate in the survey, two declined, and 51 did not respond. The schools that participated in this study included Arizona School of Dentistry & Oral Health, Western University of Health Sciences College of Dental Medicine, University of Florida College of Dentistry, University of Kentucky College of Dentistry, University of Missouri-Kansas City School of Dentistry, Columbia University College of Dental Medicine, Touro College of Dental Medicine at New York Medical College, East Carolina University School of Dental Medicine, Ohio State University College of Dentistry, University of Tennessee Health Science Center College of Dentistry, Texas A&M University College of Dentistry, University of Texas Health Science Center at Houston School of Dentistry, and West Virginia School of Dentistry.

A cross-sectional study was conducted with a nationally represented sample of around 200 pre-doctoral dental students in the United States over a three-month period. Qualtrics was programmed to initiate and terminate data after dental students have completed the survey and the submission link has closed. A follow-up interview will be conducted with 5-12 last-year pre-

doctoral dental students who indicated on the mentioned survey of experience providing treatment on HIV-positive patients via telephone in July of 2019. This sample size was estimated via phenomenological qualitative research design. The exact determination of the amount of subjects to be interviewed beyond six pre-doctoral dental students will be based on when saturation has been reached.

Participants in the study include males and females of all years of study. Participants were excluded from this study include pre-dental students who have not yet started dental school, pre-doctoral dental students who were not accepted into a dental school in the United States, dentists who already completed dental school in the United States, post-doctoral dental residents and licensed dentists. Participants first read consent information, immediately following the title page. Participants were allowed to download the consent information for their own personal records. Qualtrics was programmed to force participants to answer “yes” or “no” on the question, “Do you want to take this survey?” If the participant selected “yes”, they were taken to page 3 of the online survey in order to answer eligibility screening questions. If the participant selected “no”, they were taken to the end of the survey receiving the default message, “*We thank you for your time spent taking this survey. Your response has been recorded.*” The participant was also given the option to exit the survey at any point during the duration of their response time.

Excel was used as a data analysis tool upon expiration of submissions. This was completed by running a Description Statistical Analysis on each question in the survey. In addition, the amount of respondents answering a specific question was calculated for majority percentage purposes. Data analysis was completed on a single computer in a secured office for confidentiality purposes. After the completion of data analysis, conclusions were derived by participating collaborators of this study.

## CHAPTER III

### RESULTS

Participants (n=147) were 51% females with median age (years):  $25.9 \pm 3.03$  Standard Deviation (SD). The median respondent of the survey was a D2 student  $\pm 0.95$  SD. Not enough students answered the question, “*Have you started your community-based dental experience?*” to determine if the average was statistically significant. There was no significant difference observed for means of HIV/AIDS related knowledge levels and Pre-CBDE working experience with each of the following groups: low income, homeless, injection drug users and PLWH. This information can be seen in Table 5 of Appendix B.

All questions asking participants to agree or disagree with a controversial HIV statement were found to be statistically significant. At least 80% of respondents disagreed with statements suggesting that treating HIV/AIDS patients wasted natural resources and that they should be treated in a separate dental ward if allowed treatment at all. This being said, 80 of respondents disagreed with statements suggesting that treating HIV/AIDS patients improves community health, but that such patients should be considered potentially infectious and that they should not be obligated to treat them. This information can be found in Table 2. Of great interest is that 87% of respondents stated that they feel safe potentially working with patients who are HIV/AIDS positive, while 89% of respondents stated that they would work with patients who are HIV/AIDS positive.

Table 2: HIV/AIDS Attitudes

How much do you AGREE or DISAGREE with the following statements about HIV/AIDS?					
	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Treatment of HIV/AIDS patients means wasting national resources.	2	1	8	24	80
All dental patients should be considered potentially infectious.	83	19	6	4	2
If I know that my friend has HIV, I end the friendship.	2	1	10	17	84
Supporting HIV/AIDS patients improves community health.	76	26	10	0	1
Dentists with HIV/AIDS should not be allowed to treat patients.	2	7	13	39	51
HIV/AIDS patients should be treated at a separate ward.	0	7	18	37	51
A blood test should be taken for diagnosis of HIV in all dental patients.	8	18	23	34	29
I am morally responsible to treat HIV/AIDS patients.	67	35	10	1	0
HIV/AIDS patients can live with others in the same place.	71	34	7	1	0
I am not obligated to treat HIV/AIDS patients.	3	10	17	32	50
HIV/AIDS patients can lead a normal life.	61	38	11	2	1
I can safely treat HIV/AIDS patients.	66	33	13	1	0
I will treat HIV/AIDS patients.	66	35	11	1	0
My knowledge about infection control is enough to treat HIV/AIDS patients.	35	46	19	13	1
I worry about being infected with HIV by my patients.	11	28	38	28	8
I will do CPR if HIV/AIDS patients need it.	43	43	24	3	0
It is my right to know if my patients are infected by HIV.	51	34	20	6	1

Pre-CBDE experience working with a group did not have an impact on their anticipated comfort level in working with the respective group during CBDE. At least 93% reported

willingness to treat the population groups discussed above after graduation. This data may be seen in Table 3 and Table 4 below.

Table 3: Comfort Levels

<b>How comfortable are you with treating the following underserved patients as part of your community-based dental education (CBDE) experience?</b>	<b>Extremely comfortable</b>	<b>Somewhat comfortable</b>	<b>Neither comfortable nor uncomfortable</b>
Low income	67	34	12
Homeless	42	46	17
Injection drug users	25	46	27
Supporting HIV/AIDS patients improves community health.	37	39	24
People living with HIV/AIDS	112	3	2

Table 4: Willingness Levels

<b>Would you be willing to treat the following underserved patients after graduation?</b>	<b>Yes</b>	<b>No</b>
Low income	112	3
Homeless	110	5
Injection drug users	107	8
Supporting HIV/AIDS patients improves community health.	110	5
People living with HIV/AIDS	107	7



## CHAPTER IV

### CONCLUSION

Both medical and dental services roles in managing HIV have become increasingly important to prevent a life-threatening infection. Workforce knowledge, attitudes, and intentions in regards to vulnerable populations can have a great effect on the oral health care of at-risk populations. Dental schools have a great impact on their student's decisions post-graduation to provide care for different underserved populations. Health care students who are exposed to underserved populations in clinical settings are more willing and have positive attitudes towards treating such populations.

While a statistical significant difference was not seen between knowledge levels and willingness to treat underserved populations, there is something to be said about the willingness levels of dentists and dental students to treat such underserved populations. Previous studies have shown that dentists are less likely to treat such underserved populations, so the upward trend seen in this preliminary study shows that dental schools may be having a greater impact on their students regarding who they would and would not treat. While knowledge levels were not shown to correlate with this willingness level in this study, the upward trend may show that inserting certain knowledge in dental school classes may increase the willingness rate of future dentists to provide greater access to point-of-care dental treatment for HIV positive patients.

The results of this study have made the researchers develop more questions. Why doesn't experience working with a group have an impact on their anticipated comfort level in working with the respective group during CBDE? If a high percentage claims to feel comfortable serving

underserved populations post-graduation, then why are the current underserved populations receiving dental care so low?

A major limitation of this study includes the email addresses that completed the survey. While the dental school representatives sent out an emailed survey link to their dental students, some of the responses were from a non- dental school account such as Gmail, Hotmail, or Yahoo email addresses. While it is most likely that these dental students received and completed these questions from an un-identifiable university email, it is possible that the survey could have been completed by people other than dental students in the case that the emailed link was forwarded on from original recipients. An additional limitation to this study is that 10% of the respondents merely clicked through the survey without providing answers to any of the questions. This may show that interest in the survey was lost early on and that some responses may not be the actual viewpoint or best effort put forth by the respondent. Lastly, the majority of the respondents were in their second year of dental school. Because we did not have a more widespread sample of students of all dental school years, we do not know for certain if certain knowledge levels increase or decrease the willingness levels of dental students and dentists to treat underserved populations.

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## APPENDIX A

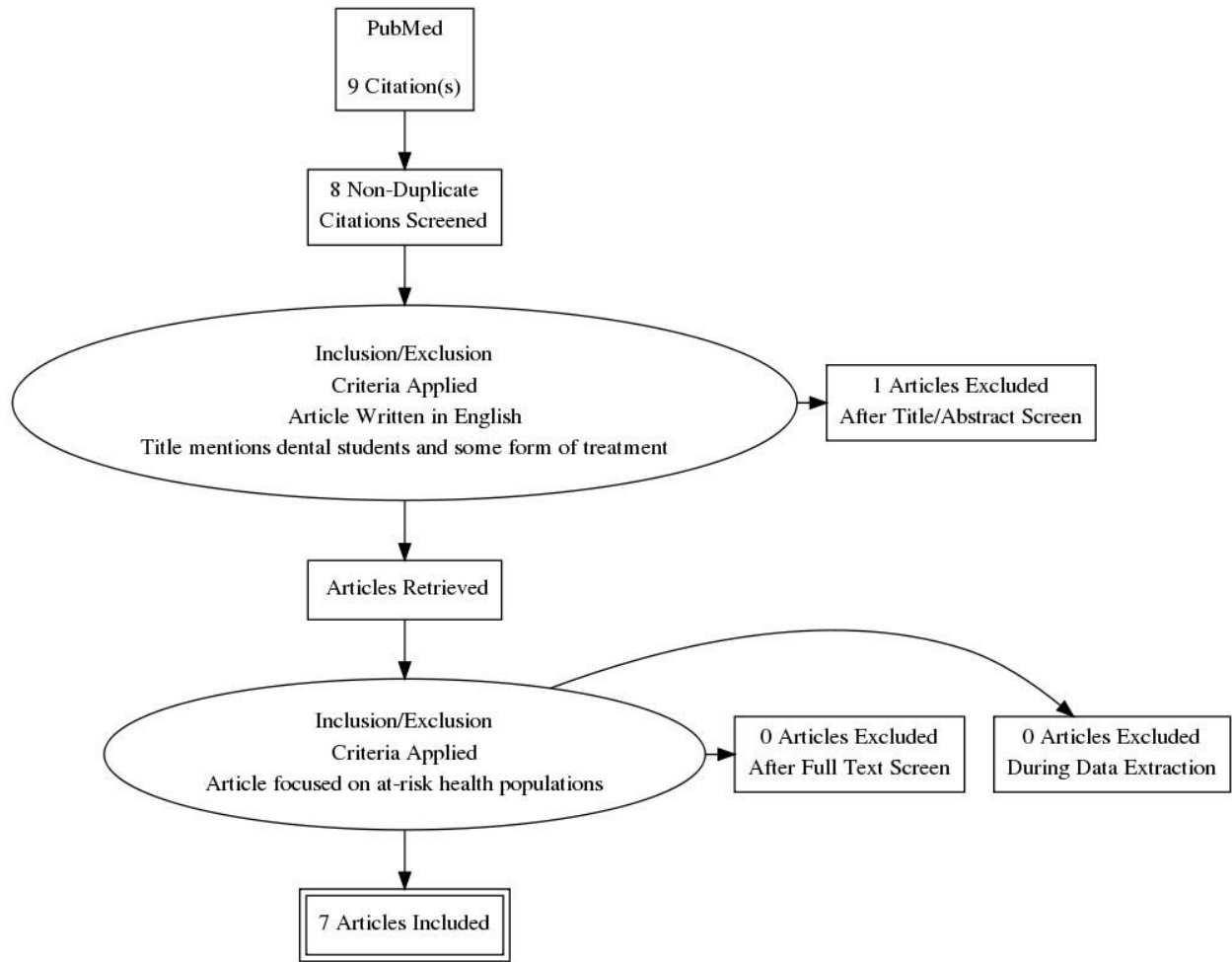


FIGURE 1- PRISMA FLOWCHART

## APPENDIX B

TABLE 5- HIV/AIDS KNOWLEDGE

<b>Do you think the statements below are TRUE or FALSE about HIV/AIDS?</b>	<b>TRUE</b>	<b>FALSE</b>
HIV/AIDS patients can contaminate dental workers.	111	11
HIV/AIDS patients can be diagnosed with oral manifestations.	106	16
ELISA is a screening test for HIV infection.	101	20
The specificity of the HIV tests is 100%.	17	105
Western blot is a definite test for HIV/AIDS diagnosis.	44	77
Dental workers can act as an intermediary for transmission of HIV.	93	29
Saliva can be a vehicle for the transmission of AIDS.	22	100
All sterilization methods have cidal effects against HIV.	43	78
Needlestick injury can transmit HIV.	113	8
The negative HIV tests surely indicate that the persons are free of viruses.	10	112
Hepatitis B is more communicable than HIV/AIDS.	104	18
Infection control methods for Hep B provide adequate protection against HIV transmission.	87	35
Medical staff are more prone for cross-contamination.	87	35
There is a lot of HIV in the saliva of HIV/AIDS patients.	6	115
There are special dental clinics for treatment of HIV/AIDS patients in India.	25	97
Now, AIDS is the most important health problem in the world.	79	41
CPR for patients with AIDS can transmit HIV infection.	32	90
<b>Do you think the following are oral manifestations of AIDS?</b>	<b>YES</b>	<b>NO</b>
Oral candidiasis	104	15
Kaposiâ sarcoma	98	21
ANUG	65	53
Major aphthous	60	58
Crohn's disease	17	101
Cytomegalovirus	55	63
Hairy leukoplakia	78	40
Severe periodontitis	82	37
Xerostomia	74	45
Salivary gland infection	62	55
Gingivitis	70	47
Herpes zoster	50	69
Herpes simplex	55	64
Condiloma	54	64
Papiloma	64	53