Title: Dean Reported Opioid and Pain Management Curriculum in US Dental Schools

Authors: Holli M. Sharples; Heidi A. Rieck, MPH; Katelyn Hagood; Chad M. Brummett, MD; Romesh P. Nalliah, BDS, MHCM

Affiliation: Holli Sharples is a research assistant with Michigan Opioid Prescribing Engagement Network (OPEN). Heidi Rieck is the Quality Improvement Manager at Michigan OPEN. Katelyn Hagood is a University of Michigan School of Dentistry DDS candidate. Dr. Chad Brummett is the Co-Director of Michigan OPEN and an associate professor in the Division of Pain Research in the Department of Anesthesiology at Michigan Medicine. Dr. Romesh Nalliah is the Associate Dean for Patient Services and Clinical Professor of Dentistry at the University of Michigan School of Dentistry.

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Corresponding Author:

Chad M. Brummett, MD cbrummet@med.umich.edu

Michigan Opioid Prescribing Engagement Network 2800 Plymouth Road North Campus Research Complex (NCRC) Building 16 Ann Arbor, MI 48109

734-615-7246

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ABSTRACT:

Purpose: Dental students learn to prescribe pain management medications in dental school, including opioids. Given the current state of opioid-related morbidity and mortality in the U.S., dental schools should evaluate the context and implementation of opioid prescribing in their dental school clinics (DSC).

Methods: A nationwide survey of deans of clinical operations at all US dental schools was conducted in 2020 related to pain management in their DSC. The Michigan Medicine institutional review board deemed this study not regulated (HUM00151607).

Results: Of the sixty-eight accredited dental schools in the United States, twenty-six dental school clinical deans responded to the survey; yielding a 40% response rate. Survey results showed differences in the levels of education for dental students on opioid prescribing and patient education requirements. A comprehensive curriculum regarding safe opioid prescribing and patient education training was reported by twelve schools . Four dental programs did not have a single guideline or policy in relation to opioids for their dental students.

Conclusion: Implementation of opioid prescribing guidelines and the surrounding context is different amongst dental school clinics, this could result in knowledge gaps and confusion for novice providers. Though many dental programs provide extensive opioid safety training, there is room for improvement and standardization to further advance patient care.

Key Words: Dental Education, Patient Education, Dentistry, Opioids

INTRODUCTION:

Between 1999 and 2019, drug overdoses involving prescription opioids quadrupled, with an estimated death toll near 247,000.[1] In 2017, almost fifty-eight out of every 100

Americans had an opioid prescription.[2] An analysis of opioid prescribing patterns from 2016-2017 determined that dentists prescribed 8.6% of all dispensed opioids nationwide, which is equivalent to over eighteen million pills.[3]

Third-molar extractions are one of the most common dental procedures for young adults in the US with 3.5 million patients a year.[4] It has been shown that dentists are the primary opioid prescriber for patients ten to nineteen years old (30.8%).[5] This population being exposed to opioids is a risk to their well-being, including the potential to become opioid dependent. In a 2010 report from dentists working in West Virginia, 41% of dentists expected their patients, following a third-molar extraction, to have left-over opioids.[4] This could be a result of "just in case" prescribing, where oral health professionals prescribe extra opioids for patients to address potential, yet unseen, postoperative complications.[6] The presence of just one or more dental opioid prescriptions inside a family home increases a family member's risk for overdose from 1.0 to 1.7 for every 10,000 procedures.[7]

Despite the common practice of prescribing opioids--particularly hydrocodone (Vicodin)--for tooth extraction patients, NSAIDs are known to be more effective and safe for relieving postoperative pain.[8] Whereas opioids offer analgesia for acute pain, most patients will have some opioid-related side effect (e.g. nausea, vomiting, constipation, sedation) and some will develop long-term dependence or addiction.[9] By comparison, NSAIDs are capable of both targeting acute surgical pain and reducing inflammatory swelling, without the potential for many of the side effects from opioids or addiction.[8] Investigations into the effectiveness between NSAIDs and opioids have proven NSAIDs to be superior in combining postoperative pain relief and healing surgical trauma.[8]

Given that dentists require an understanding of the opioid crisis and education about safe prescribing practices, the dental education community has a major role in shaping future provider attitudes toward opioid prescribing. As a result, dental schools should regularly reevaluate the way opioid prescribing is implemented in their dental school clinics (DSC) and

update or reinvent their curriculum on pain management and patient education based on current evidence and state and federal policy.[10] The purpose of this study is to survey deans of clinical operations across all US dental schools to understand how opioid prescribing is implemented in DSCs.

METHODS AND MATERIALS:

This survey project was reviewed and approved as not-regulated quality improvement work by Michigan Medicine's Institutional Review Board, project number HUM00151607. Questions were developed by the study team and was tested amongst four clinic deans and two clinical administrative colleagues. The survey was comprised of fourteen questions with multiple choice and additional write-in options, designed using specific language to assess opioid and pain management curriculum (Appendix 1), and built in the online platform Qualtrics. Sixty-five out of sixty-eight email addresses were collected via online search for administrators at dental schools across the United States who provide leadership over their school's clinical enterprise. The survey link was individually emailed to deans of clinical operations in the United States in July 2020. Participants who opted-in completed the survey online through the provided link. No geographic or identifying information was collected to keep all responses anonymous. A reminder email was individually sent to every dean for clinic operations in August 2020; the survey closed in September 2020. Descriptive statistics were calculated using Microsoft Excel.

RESULTS:

Of the sixty-five accredited dental schools in the United States who received the survey, twenty-six dental school clinical deans responded to the survey; yielding a 40% response rate.

Not all respondents answered every question in the survey; calculations are based on the number of respondents per question. Of the twenty-six responding schools, the size of dental programs was evenly distributed (Table 1); 32% of the respondents were from relatively small programs (with 51-100 students); and 24% of the respondents were from medium sized programs (with 101-200 students). The remaining 44% of the respondents were from large programs (with 201+ students). Most clinical deans oversee a similar mix of specialty clinical training programs.

Regarding the perceived responsibility of an individual opioid prescription, the majority of clinical deans reported that the individual provider/prescriber of an opioid prescription was the one responsible (Figure 1). Twenty percent of responding clinical deans stated that they were ultimately responsible for any opioid prescriptions written in their clinic. Five clinical deans opted to write in an answer for this question: three of the write-in answers described a "shared" responsibility (Appendix 2.1).

The majority of the responding dental programs offered guidelines to their providers for opioid prescribing or patient education requirements. Altogether, 60% of responding programs provided procedure-specific opioid prescribing limits and about 70% of the responding programs required their students to educate patients on safe opioid storage or disposal (Table 2). Additionally, 95% of the responding dental programs required a check of the Prescription Drug Monitoring Program (PDMP) before an opioid prescription was written. Half of the responding dental programs required their students to educate patients how to correctly taper medications when coming off an opioid prescription.

Overall, four dental programs (15% of respondents) did not have a single guideline or policy in relation to opioids for their dental students (Figure 2). From the programs that did provide opioid policies, the majority (42%) of those dental programs communicated their guidelines/policies to their student body through email or curricular lectures (30%). A smaller percentage of dental programs communicated their opioid guidelines by Town Hall meetings

(15%). Five dental schools (19%) opted to write in an answer for this question instead, which comprised of using the clinic manual (2), faculty or leadership meetings (2), and evidence-based guidelines (1) as communication methods

The majority, 90%, of respondents reported being fully aware of their state's current laws about opioid prescribing related to dentistry. Only two school clinic administrators felt "somewhat" aware of the current opioid laws. None of the respondents reported being unaware of their state's laws on opioid prescribing in dentistry. Additionally, every responding clinical dean reported that their dental school was in alignment with state laws relating to opioid prescribing, patient education on opioids, and the PDMP. Nearly 20% of respondents did not provide an answer to this question. Eighty percent of clinical deans selected an answer regarding their schools' alignment with state laws on opioid prescribing and the PDMP, and 61% of clinical deans selected an answer option regarding their school's alignment with state laws on patient education for receiving an opioid prescription.

Approximately 20% of the dental programs were interested in collaborating to determine procedure-specific opioid prescribing guidelines and formulate standardized patient education across all American Dental Centers on opioid storage and disposal (Figure 3). The majority of the dental programs reported already having institution-wide guidelines in place for prescription opioids and patient education about opioids.

Regarding educational materials, six dental programs reported that they did not offer their patients any education materials regarding opioid storage or disposal. For the dental schools that did provide materials, the majority of the materials were only printed in English (15) or Spanish (12). Other languages such as Arabic (3), Cantonese (2), French (1), Mandarin (1), Russian (1), and Vietnamese (1) were less common.

Almost half of the dental schools responded that they track the patient reported outcomes after procedures, such as patient satisfaction with pain management, opioid consumption, etc.

DISCUSSION:

The dental school accreditation process coordinated by the Commission on Dental Accreditation (CODA) affords much autonomy to dental schools. Many other health profession accrediting bodies are more prescriptive. Dental school accreditation processes allow schools to create their own pathway for graduating competent clinicians. The challenge of dental education is extraordinary - unlike medicine, dental schools are charged with graduating fully licensed and independent practitioners within a four year program. Dental schools, essentially, take a college student and make them an independent healthcare provider, with a license to prescribe medications, in a surgical field within four years. A dean for clinical operations has a variety of goals that may be conflicting - to deliver high quality care, maximize profits (or more accurately in dental education, to minimize losses), continually improve care delivery and the patient experience, and create an environment to train novice providers. The lack of experience of providers means that deans of clinics must pay close attention, and develop policies, that keep patients safe and enable the delivery of high-quality care while providing close supervision to providers.

This survey showed that the implementation of opioid prescribing in DSCs across US are highly variable in delivery and content. While most dental programs reported having guidelines on opioid prescribing and requirements on patient education, some programs reported not having institution-wide regulations. It is likely that the variation in opioid prescribing guidelines and context is due to a myriad of reasons. Dental school settings are complex with hundreds of providers delivering care under the supervision of licensed dentists. Moreover, most dental schools also have graduate programs where dentists are studying to specialize in one field of dentistry. Finally, many dental schools also have Faculty Practices where the faculty deliver care to patients like a regular private practice setting.

Within such a complex environment there could be a large variation in skills and knowledge of the prescribing provider. In some settings students in DSCs draft the prescription and the supervising faculty review and approve it. In other settings, the faculty independently write the prescription. With so many variables, it is important to have standardized approaches to complex issues like the matter of opioid prescribing. Without institutional or statewide guidelines, dental providers could be at risk of over- or under prescribing opioids. Although the Centers for Disease Control and Prevention (CDC) and the American Dental Association (ADA) offer broad guidelines, there is no prescriptive guidance for prescribers and dental providers could be at risk of over- or under prescribing opioids. In several general surgical procedures there are far more specific instructions to prescribers - for example, in laparoscopic cholecystectomy the guideline for 15 tablets of hydrocodone/acetaminophen, 5/325 mg (OME, 75 mg) or 15 tablets of oxycodone, 5 mg (OME, 112.5 mg). In more specific terms, despite the lack of standardized prescribing guidelines, 60% of the responding dental programs offer novel procedure-specific opioid prescribing limits for their faculty and dental students. However, there is no national guideline related to procedure-specific opioid prescribing limits and these organizations should be encouraged to publish and disseminate these standards to enable others to learn and implement similar guidelines. These programs set a national precedence in their progressive education and drive to fight the opioid epidemic.

When it comes to opioid safety, studies show that patients with opioid prescriptions tend to keep their prescriptions after they've stopped using them;[11] and the majority of misused prescription opioids are known to come from friends and family.[12] This survey reports about 70% of schools require their students to educate patients on safe opioid storage and disposal. Training dental students to consistently educate their patients may decrease the potential for their opioid prescriptions to be misused or diverted into the community.[13, 14, 15] Though education on storage and disposal is reported, there is room for continued improvement in tailoring patient pain management needs to prescription sizes to minimize left over medications

in the first place. This is especially important to consider before weekends and holidays, as previous studies have shown increased opioid prescription fills after dental procedures performed before weekends and holidays.[6]

Additionally, half of the responding dental programs in the US require students to educate their patients on how to taper off of their opioid prescriptions. Patients given proper education by their prescriber will be more aware of the risks from their opioid prescriptions and take more precautions to safely consume, store, and dispose of their medication.

To ensure all dental students are receiving the same complete and accurate education on opioids, the method of communication for such guidelines needs to be efficient and effective. From the survey, four dental schools reported not having any formal guidelines or policies regarding opioid prescribing or patient education on opioid prescribing. This lack of standardization could lead to disparities in the level of training regarding opioids between dental students, which may contribute to inconsistent opioid prescribing patterns and inconsistent patient education. However, for the dental programs with opioid related guidelines, their methods of communication are still highly variable. While email and regular lectures are the most common sources, the rates are low. The lack of a consistent source of guidelines, and a poorly understood or proven mechanism of communication, can distort or prevent the guidelines from reaching every student provider. Schools may consider integrating questions related to opioid prescribing and patient education into their written exams or objective structured clinical examinations (OSCE).

Due to the highly addictive nature of opioid medications, there comes a lot of responsibility in prescribing opioids to patients. An opioid prescription, when not properly distributed, can cause more harm than good: misuse, dependence, addiction, overdose, and diversion.[16, 17] Clinical deans oversee the operations of the dental clinic, however, the work of dentists is very autonomous and it can be difficult to standardize practices Subsequently, a majority of responding clinical deans described the prescriber of the opioid as the only one

responsible for the outcome(s) of that prescription. The dental school clinic environment provides an opportunity to deliver highly structured education to students around opioid prescribing and patient education. This has the potential to dramatically reduce opioid prescribing by dentists in the United States.

A way to determine safe opioid prescribing guidelines in dental clinics is to utilize patient reported outcomes (PROs). PROs allow dentists and dental students to track a patient's postoperative pain, how many opioids they are consuming and how much medication is typically leftover. Our group has previously published on this same endeavor and found that, in relation to opioids for extractions, about 50% of pills go unused.[18] With this information, dentists have an advantage in understanding their patients while also developing safe, effective opioid prescribing practices. Of the responding dental programs, nearly half track patient reported outcomes postoperatively. Future research should be pursued for deeper understanding of how opioid prescribing is implemented in teaching clinics, how many pills patients use for pain management, how many pills are unused, and therefore

There are limitations in a survey-based study. Firstly, the response rate was low and this increases the risk that data is not generalizable. The COVID-19 pandemic became a national emergency in the United States between February and March 2020; healthcare priorities shifted and this may have affected the survey response rate. Additionally, not all respondents answered every question in the survey making the sample sizes per question smaller and variable. As mentioned, the context around prescribing in a DSC is variable with students sometimes drafting the prescription and sometimes not. This can even vary within clinics of the same school and may be driven by faculty preferences. This survey cannot capture this level of nuance in prescribing practices in DSC's. Finally, clinic deans who responded to the survey may have answered independently based on their knowledge or they may have sought accurate answers from other members of the school's leadership team. This could have created additional variability and is a threat to generalizability.

CONCLUSION:

Of the twenty-six dental schools that responded to this survey, there were differences in the levels of education for dental students on proper opioid prescribing and patient education requirements and variability in the means of delivering that education. Many schools utilized internally developed prescriptive guidelines for dental procedures that are similar to other surgical fields of medicine. However, these remain internal and not publicly available guidelines

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Table 1. Demographics	
Size of dental school:	**n = 25**
0-50 students in the pre-doctoral program	0 (0%)
51-100 students in the pre-doctoral program	8 (32%)
101-150 students in the pre-doctoral program	4 (16%)
151-200 students in the pre-doctoral program	2 (8%)
201+ students in the pre-doctoral program	11 (44%)
Specialties and residencies overseen: multiple specialties permitted	
Orthodontics	22
Endodontics	20

Periodontics	20
Oral Surgery	19
Pediatric Dentistry	19
Prosthodontics	17
General Practice Residents	10
Advanced Education in General Dentistry (AEGD) Residents	9
Hospital Dentistry	7
Dental Public Health	6
Other write-in: Craniofacial Orthodontics Fellowship and Oral Medicine, Implant fellows, Anesthesia, Dental Hygiene program, Implant, Faculty Practice, Operative	6

Table 2. Presence of guidelines, etc.:	**Number of Respondents**	**Yes**	**No**
Procedure-specific opioid prescribing limits	20	12 (60%)	8 (40%)
Requirement to educate patient about safe opioid storage	20	14 (70%)	6 (30%)
Requirement to educate patient about safe opioid disposal	19	14 (74%)	5 (26%)
Requirement to check a Prescription Drug Monitoring	20	19 (95%)	1 (5%)

Program before prescribing opioids			
Requirement to educate patient about correct tapering when coming off an opioid prescription	16	8 (50%)	8 (50%)

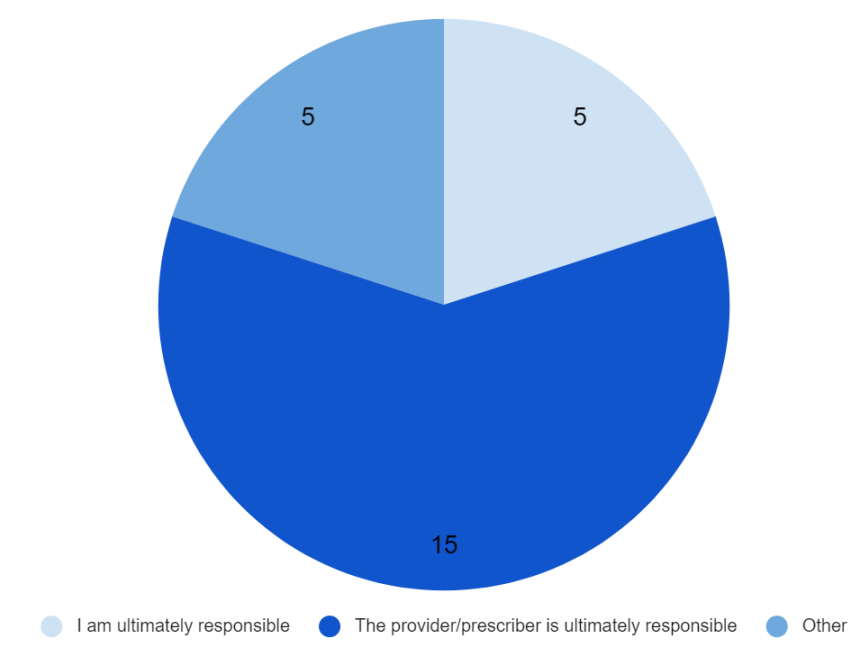

Figure 1. CAPTION: Clinical dean respondents' perceived role of responsibility regarding opioid prescriptions

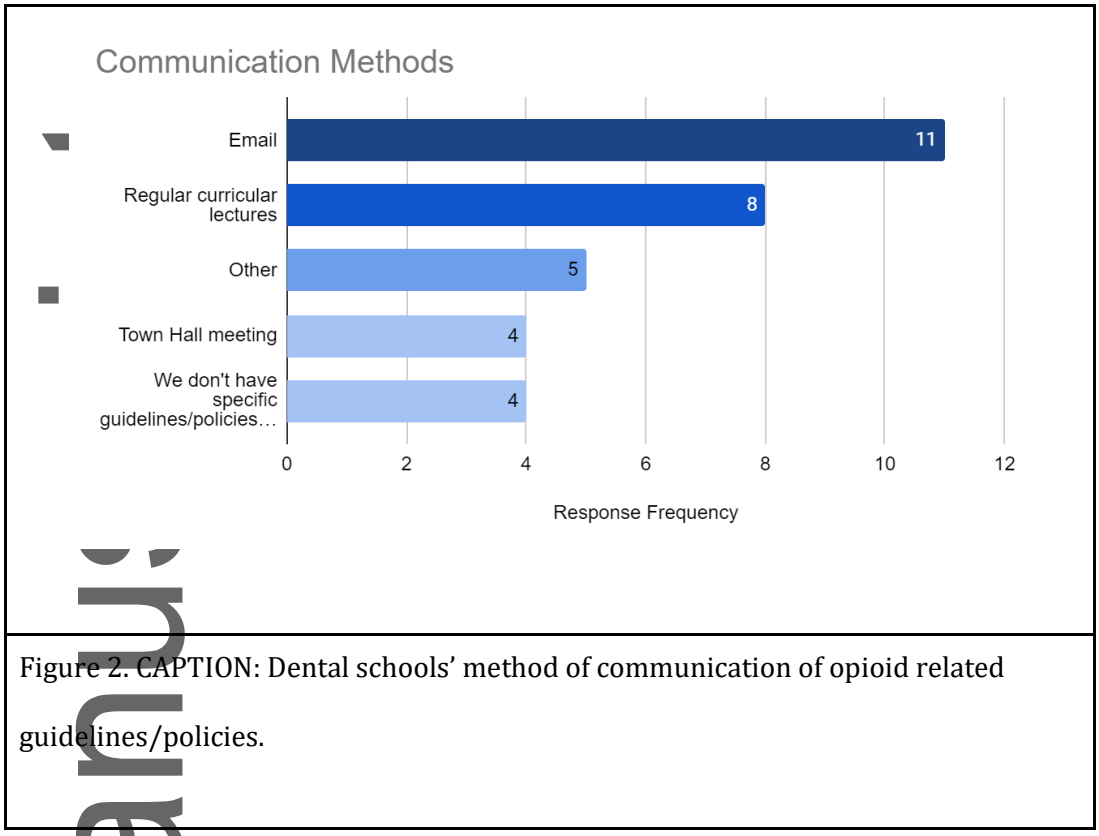

Figure 2. CAPTION: Dental schools' method of communication of opioid related guidelines/policies.

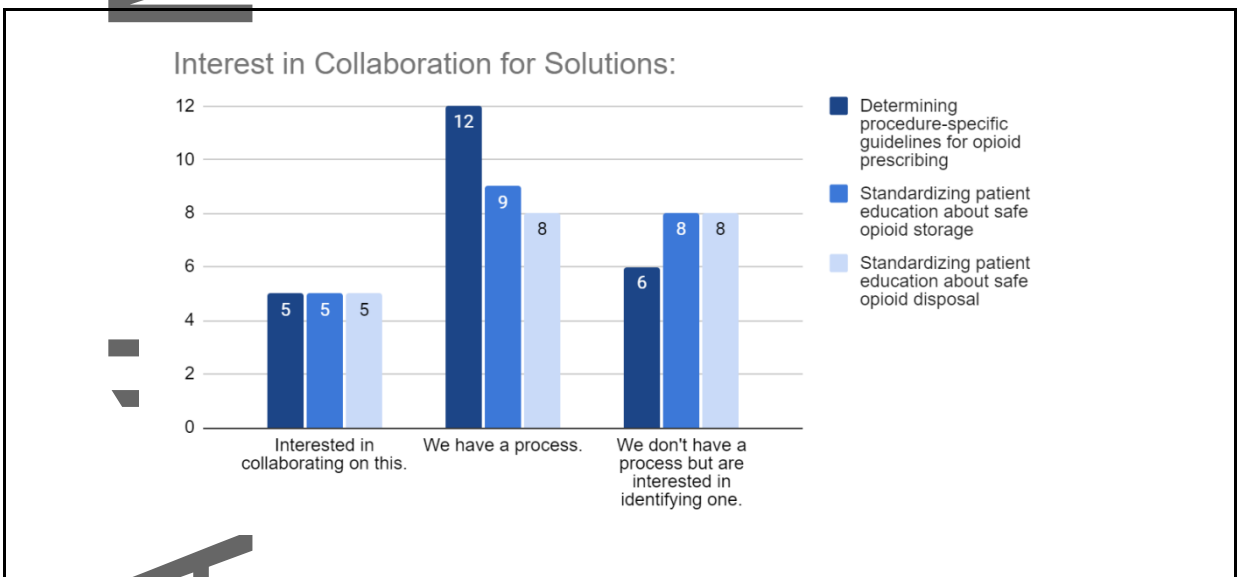

Figure 3. CAPTION: Dental schools' interest in learning about or collaborating for solutions to opioid related topics.

APPENDIX 1: Survey Language

Q1 What is the size of your predoctoral dental school program?

o 0-50 students in the pre-doctoral program (1)

o 51-100 students in the pre-doctoral program (2)

o 101-150 students in the pre-doctoral program (3)

o 151-200 students in the pre-doctoral program (4)

o 201+ students in the pre-doctoral program (5)

Q2 Which specialties and residents do you oversee as the Dean for Clinical Services?

Please select all that apply.

▢ Dental Public Health (3)

▢ Endodontics (1)

▢ Prosthodontics (2)

▢ Oral Surgery (4)

▢ Periodontics (5)

▢ Pediatric Dentistry (6)

▢ Orthodontics (7)

▢ Hospital Dentistry (8)

▢ General Practice Residents (9)

▢ Advanced Education in General Dentistry (AEGD) Residents (10)

▢ Other (11) _____

Q3 As the Dean for Clinical Services, how do you see your role in overseeing opioid prescribing in your dental school clinics?

o I am ultimately responsible (1)

o The provider/prescriber is ultimately responsible (2)

o Other (3) _____

Q4 Does your school have specific guidelines/policies/processes related to opioids?

Please select all that apply.

	Yes (1)	No (2)	I don't know (3)
Procedure-specific opioid prescribing limits (1)	▢	▢	▢
Requirement to educate patient about safe opioid storage (2)	▢	▢	▢

Requirement to educate patient about safe opioid disposal (3)	▢	▢	▢
Requirement to check a Prescription Drug Monitoring Program before prescribing opioids (4)	▢	▢	▢
Other (5)	▢	▢	▢

Q5 If your program does have specific guidelines/policies/processes, how are they communicated throughout the school?

Please select all that apply.

▢ We don't have specific guidelines/policies/processes (1)

▢ Email (2)

▢ Town Hall meeting (3)

▢ Regular curricular lectures (4)

▢ Other (5) _____

▢ I don't know (6)

Q6 Are you aware of your state's current laws about opioid prescribing as it relates to dentistry?

o Yes (1)

o No (2)

o I don't know (3)

Q7 Is your school in alignment with state laws related to the following topics?

Please select all that apply.

	Yes (1)	No (2)	I don't know (3)
Opioid prescribing (1)	▢	▢	▢
Patient education for receiving an opioid prescription (2)	▢	▢	▢
Use of Prescription Drug Monitoring Programs (PDMP) (3)	▢	▢	▢

Q8 Please select all areas that you would be interested in learning more about or collaborating for solutions:

	We have a process. (2)	We don't have a process but are interested in identifying one. (4)	Interested in collaborating on this. (1)
Determining procedure-specific guidelines for opioid prescribing (1)	▢	▢	▢
Standardizing patient education about safe opioid storage (2)	▢	▢	▢ \
Standardizing patient education about safe opioid disposal (3)	▢	▢	▢

Q9 Other areas of interest for collaboration:

_____

Q10 If you have information for patients regarding opioid use, storage and disposal, which languages do you have them available in?

	Please select all that apply: (1)
We do not have patient information about opioids (19)	▢

English (4)	▢
Arabic (15)	▢
Spanish (6)	▢
French (5)	▢
Italian (7)	▢
Greek (8)	▢
Mandarin (9)	▢
Cantonese (10)	▢
Haitian Creole (11)	▢
German (12)	▢
Russian (13)	▢
Korean (14)	▢
Vietnamese (16)	▢
Tagalog (17)	▢
Other (18)	▢

Q11 Does your school of dentistry track opioid prescribing data?

o Yes (1)

o No (2)

o I don't know (3)

Q12 Does your school of dentistry track patient reported outcomes after procedures?

Such as patient satisfaction with pain management, opioid consumption, etc.?

o Yes (1)

o No (2)

o I don't know (3)

Q13 Please describe any barriers that you have faced related to delivering opioid education to your students and faculty. If you have overcome these barriers, please describe how.

_____

Q14 Additional comments related to opioid prescribing at your school of dentistry:

_____

APPENDIX 2: Qualitative Responses

Q3 As the Dean/Director for Clinical Services, how do you see your role in overseeing opioid prescribing in your dental school clinics?

5 written answers:

- We have a designated faculty member in charge with myself as a second in command.
- Shared. I can and have with our Dean implemented universal guidelines that the provider is expected to use to pair w/clinical findings as they make their decisions to prescribe.
- I believe this is a combined responsibility. The provider must understand the risks/benefits prior to prescribing. My role is to be certain that our providers understand those risks and adhere to appropriate prescribing guidelines.
- Both myself and the providers are ultimately responsible
- Attending faculty is ultimately the one who signs off

Q7 - If your program does have specific guidelines/policies/processes, how are they communicated throughout the school? Please select all that apply.

5 written answers:

- Part of our clinical manual
- Committees w/leadership
- Clinic Manual

- Monthly faculty meetings
- Evidence-Based Guidelines