ALLEGHENY COUNTY HEALTH DEPARTMENT

2020 SURVEY OF ADHERENCE TO ANTIBIOTIC PROPHYLAXIS AND OPIOID PRESCRIBING GUIDELINES AMONG DENTISTS PRACTICING IN ALLEGHENY COUNTY

Taylor Robinson

Molly Nace, MPH

Dr. Kristen Mertz, MD, MPH

Acknowledgments

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INTRODUCTION

It is estimated that there are over 200,000 dentists working in dentistry in 2020; this is approximately 60 dentists for every 100,000 people in the U.S.[1] Dentists prescribe a significant percent of opioids and antibiotics. Outpatient providers prescribe an average of 270 million prescriptions of antibiotics per year [2], 10% of which are prescribed by dentists.[3] Dentists are among the leading prescribers of opioids, after primary care providers and internists.[5] In 2012, 6.4% of all opioid prescriptions came from dentists, amounting to 18.5 million total prescriptions.[6,7]

Studies have shown that dentist may overprescribe antibiotics and opioids leading to adverse outcomes. One retrospective cohort study found that prescription of antibiotics by dentists were unnecessary 81% of the time.[4] Opioid prescriptions in dental care are mainly used to manage pain following invasive surgeries and are recommended to be prescribed for short-term use.[8] In one cross sectional analysis, it was found that more than one-half of opioid prescriptions for dental procedures exceeded recommended guidelines.[9] Adherence to best-practice prescribing guidelines is essential to preventing negative outcomes.

Improper practices related to antibiotic prophylaxis prescribed to individuals seeking dental care can contribute to the development of antibiotic resistance, where bacteria acquire the ability to survive in the presence of drugs that are designed to kill them. Resistance is one of the top threats to public health. The primary drivers of antibiotic resistance are overuse and misuse.[12] As of 2020, antibiotic resistant infections impact 2.8 million people, cause 35,000 deaths, and cost more than $2 billion dollars annually.[10,11] Judicious use of antibiotics is key to avoiding the development of antibiotic resistance.

Similar to antibiotics, opioids are also frequently overused and can lead to negative health outcomes. It is estimated that approximately 23% of the first opioid prescriptions for children and adolescents come from dentists.[7] First-time opioid prescriptions for orofacial pain have contributed to an increased risk for substance abuse for adolescents and young adults. One study found that opioid prescriptions provided by dentists increased the risk of subsequent opioid abuse diagnosis among adolescents and young adults by 5.4%.[8] Reducing misuse and overuse of opioids is key to minimizing the potential for abuse and diversion of opioids.

To limit the amount of antibiotics prescribed by dentists, the American Dental Association (ADA) and the American Heart Association (AHA) developed guidelines specifying the conditions for which antibiotic prophylaxis before invasive dental procedures is appropriate.[13] Despite evidence to suggest that dentists in the U.S accept current antibiotic prophylaxis guidelines,[14] no data are available summarizing rates of appropriate prescribing among dentists in Allegheny County.

The ADA does not currently endorse any comprehensive national guidelines on opioid use in dental settings. However, Pennsylvania has developed statewide

guidelines[15] concerning best practices surrounding opioid prescribing, which the ADA promotes on its opioid policy webpage. Awareness of and compliance with Pennsylvania state guidelines among dental care providers in Allegheny County is currently unknown.

There is limited knowledge about prescribing practices among dentists in Allegheny County. The Allegheny County Health Department developed and administered a survey to identify gaps in prescribing knowledge and practice. The results can increase awareness of the importance of judicious prescribing and to provide the Pennsylvania Department of Health (PADOH) with data to support their future dental stewardship initiatives.

Aims

Aim 1: Assess Allegheny County dentists' compliance with antibiotic prophylaxis and opioid prescribing guidelines set forth by the ADA, the AHA, and the Commonwealth of Pennsylvania

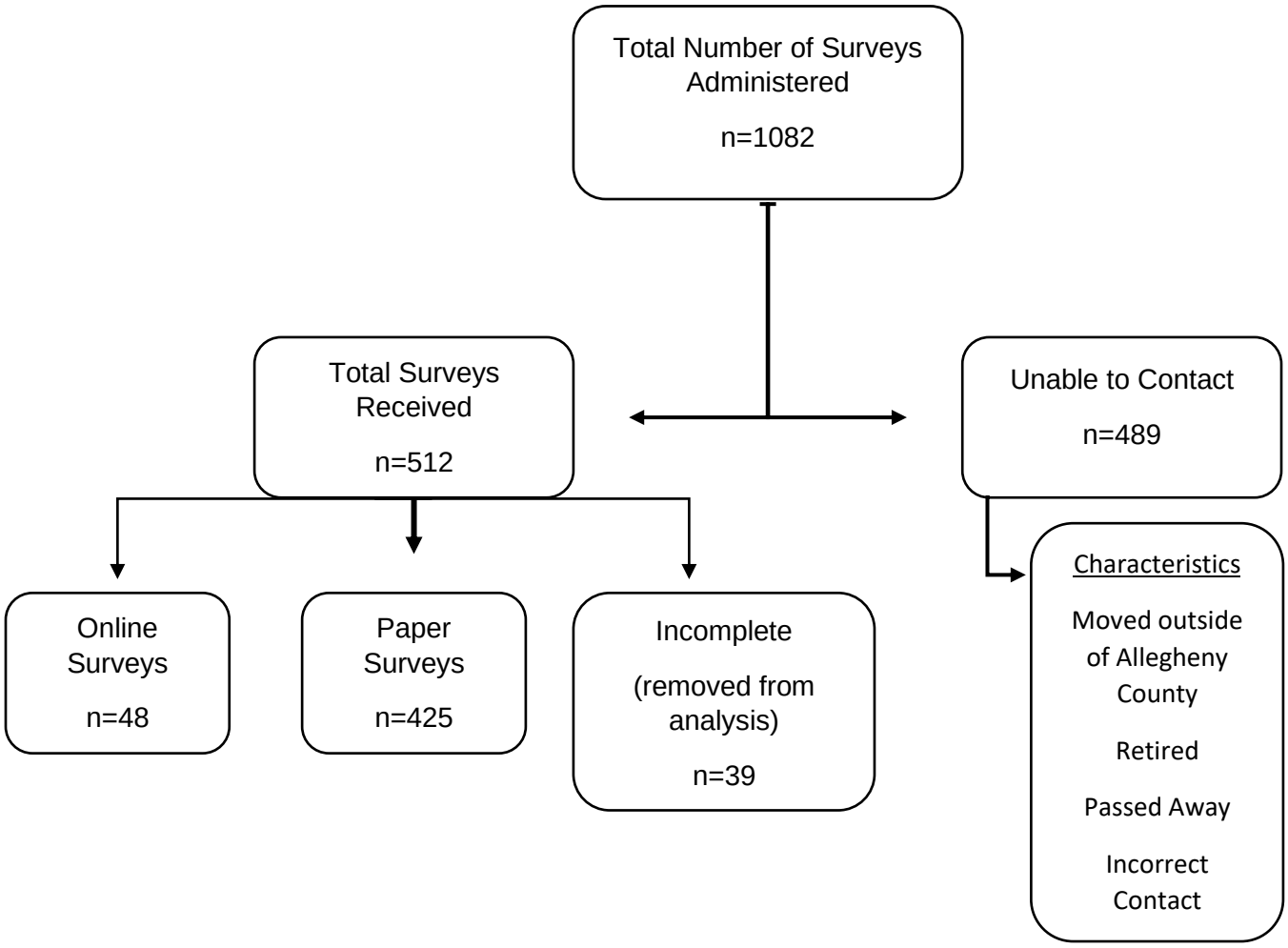
Developed a survey to address knowledge of and compliance with antibiotic prophylaxis and opioid prescribing guidelines. Surveys were sent to all dentists practicing in Allegheny County. Calculated the percentage of dentists in Allegheny County who are compliant with the guidelines mentioned above using survey data.

Aim 2: Assess the factors that may influence Allegheny County dentists' prescribing practices

Stratified compliance results by clinical characteristics in order to understand any differences in compliance between dentists.

METHODS

Figure 1: Flow Diagram of Survey Response Types



Survey Methods

The survey was developed by the Allegheny County Health Department (ACHD) to assess knowledge of and compliance with the main tenants from the following guidelines:

- *Prevention of Infective Endocarditis*, AHA[16]
- *The Use of Prophylactic Antibiotics Prior to Dental Procedures in Patients with Prosthetic Joints*, ADA[17]
- *Opioids in Dental Practice*, Commonwealth of Pennsylvania[15]

Survey questions were mainly based on dental surveys previously developed by other jurisdictions such as those in Illinois and Minnesota. Data collected in this study included provider clinical characteristics (e.g. specialty, years in practice, practice setting), self-reported prescribing behaviors, and knowledge of current ADA promoted guidelines. The first rendition of the survey was shared with a maximum of ten dentists (both practicing and retired) for feedback on the clarity and accuracy of content. Those who provided feedback on the original survey were not eligible to complete the final survey and were therefore not included in subsequent analyses.

Allegheny County does not have an existing email list for all licensed dentists. The PA Coalition for Oral Health and ACHD's Pediatric Dentistry service provided mailing addresses of all licensed dentists in Allegheny County via the state licensing board. A paper copy of the survey, along with a URL link and scannable QR code to an online version of the survey, and a prepaid return envelope were mailed to licensed dentists practicing in Allegheny County using the available mailing addresses. A reminder post card containing the QR code link was sent out three weeks after the survey was distributed. Contact information by phone was obtained from a separate NPI database shared with ACHD by the PA Department of Health (PA DOH). The phone numbers were matched with the address list with names of those on the NPI list. Two weeks after the surveys were sent, volunteers called providers on the mailing list with available phone numbers at least twice and reminded dentists to complete the survey. Volunteers also recorded responses from providers over the phone into paper surveys if the dental provider was willing at the time of the follow-up call.

All survey responses were collected on paper or via Checkbox online service. For paper surveys, volunteers performed double data entry by inputting responses into Checkbox. Figure 1 displays a flow diagrams of the administered surveys and completed surveys used in subsequent analyses. All survey results were imported into SAS 9.4, duplicate observations were removed, and discordant entries from the double data entries were identified and reconciled. Of the returned surveys, 37 were removed from analyses because the dentists were not licensed in Allegheny County and 2 responses were incomplete (n=39 removed from analyses).

The clinical characteristics of responses were summarized using descriptive statistics. Frequencies and percentages were used to describe awareness of and compliance with each of the guidelines specified. Percent compliance was also assessed by characteristics such as specialty, years in practice, Medicaid provision, and average practice hours per week.

RESULTS OF 2020 DENTAL SURVEY

Survey Response Rates

Of the 1082 surveys administered, 512 were received and 489 were undeliverable. (See Figure 1). The reasons the surveys were not returned included dentists moving outside of Allegheny County, retiring, passing away, or if the mailing address was not correct. Most of the surveys received were paper surveys (425). There were 39 surveys removed from analyses because the dentists were not registered in Allegheny County (37) or the survey was incomplete (2). The response rate for this study was 47%.

Demographic Characteristics

Most dentists participating in this survey represented single provider practices (61%), followed by group practices (29%). (See Table 1: Demographic Characteristics of All Dentists Participating in the 2020 Dental Compliance Survey). Those grouped in "Other Practices" served at Federally Qualified Health Centers (FQHCs), mobile locations, hospitals, and surgery centers. Other dentist practice types not included in the survey results were dental anesthesiologists (6), implant dentists (2), maxillofacial prosthodontics dentists (2), and institutional prison dentists (1). Of the dentists surveyed, 71% worked at practices that did not accept Medicaid – these dentists are grouped as non-Medicaid providers in our analyses. General specialists made up 73% of dentists surveyed, with a lower percentage of dentists in other specialties. Dentists who worked more than 20 hours a week made up a greater percentage of the study (89%), while a lower percentage (11%) were part-time. Of the dentists surveyed, 59% practiced dentistry more than 30 years, while only 40% have practiced 30 years or less.

Prophylactic Antibiotic Guidelines: Dental Procedures

According to ADA guidelines, prophylactic antibiotics for patients with high-risk medical conditions should be considered for the following dental procedures: dental extractions, periodontal procedures, and dental implant placements. (See Table 2). Of the dentists surveyed, 83% prescribe antibiotics for dental extractions, 72% for periodontal procedures, and 63% for dental implant placements.

Seventy-six percent of non-Medicaid providers prescribe antibiotics for periodontal procedures, while 64% of Medicaid providers prescribe antibiotics for this procedure. Sixty-nine percent of dentists who have practiced thirty years or less prescribe antibiotics for dental implant placements, while 59% of dentists who have practiced more than thirty years prescribe for this procedure.

When considering prophylactic antibiotics for patients with high-risk medical conditions, ADA guidelines do not support prescribing antibiotics for root canals, supra-gingival scaling, routine anesthetic injections with no infected tissue, or placement of direct restoration procedures. Fifty-five percent of all dentists prescribe antibiotics for

root canals, 33% for supragingival scaling, 20% for routine anesthetic infections, and 19% for placement of a direct restoration.

A greater percentage of non-Medicaid providers (57%) and dentists who have practiced thirty years or less (59%) prescribe antibiotics for root canals relative to Medicaid providers (45%) and dentists who have practiced less than thirty years (49%). Statistical significance of these differences was not assessed.

Prescription of antibiotics for root canals differs by specialty. (See Table 4). Sixty percent of general specialty dentists report prescribing antibiotics for root canals. Though the other specialties have lower representation in this study, the following frequencies were observed: 72% of those in endodontics prescribe for root canals and 71% for those in prosthodontics. The other specialties had lower percentages for prescribing for root canals.

Prophylactic Antibiotic Guideline Compliance: High-Risk Medical Conditions

ADA guidelines recommend that prophylactic antibiotics be considered before or immediately following invasive procedures for patients who have the following high-risk conditions: cardiac transplantation with valve regurgitation due to a structurally abnormal valves, previous infective endocarditis, prosthetic cardiac valves or valve repair with prosthetic materials, repaired congenital heart defect with residual shunt or valvular regurgitation at/adjacent to the site of a prosthetic patch/device, and unrepaired cyanotic congenital heart disease. (See Table 3). Eighty-eight percent of dentists prescribe for patients with cardiac transplantation with valve regurgitation, 81% for previous infective endocarditis, 80% for prosthetic cardiac valves, 77% for repaired congenital heart defects, and 58% for unrepaired cyanotic congenital heart disease.

Eighty-nine percent of dentists who have practiced more than thirty years prescribe for patients with cardiac transplantation, while only 81% of dentists who have practiced 30 years or less prescribe for this condition. Sixty-seven percent of Medicaid providers and 62% of dentist who have practiced thirty years or less prescribe antibiotics to patients with unrepaired cyanotic congenital heart disease, whereas, only 56% of non-Medicaid providers and 56% of dentists who have practiced more than thirty years prescribe for this condition.

Patients with mitral valve prolapse, any congenital heart disease, and prosthetic joints are not recommended to receive prophylactic antibiotics before or immediately following certain invasive procedures. 27% of all dentists prescribe prophylactic antibiotics for mitral valve prolapse, 26% for any congenital heart disease, and 78% for prosthetic joints.

Twenty-four percent of Medicaid providers and 23% of dentists who have practiced thirty years or less prescribe for mitral valve prolapse, while 28% of non-Medicaid providers and 29% of dentists who have practiced thirty years or more prescribe for this condition. Twenty-three percent of Medicaid providers and 20% of

dentists who have practiced thirty years or less prescribe antibiotics for any congenital heart disease, while 28% of non-Medicaid providers and 29% of dentists who have practiced more than thirty years prescribe for this condition. Sixty-four percent of Medicaid providers prescribe antibiotics for prosthetic joints. Eighty-three percent of non-Medicaid providers, 79% of dentists who have practiced more than thirty years, and 76% of dentists who have practiced thirty years or less prescribe antibiotics for this condition.

Eighty-two percent of general specialists prescribe antibiotics for patients with prosthetic joints, 82% for endodontics, 82% for oral and maxillofacial surgeons. Lower percentages of prescribing for prosthetic joints were seen in other specialties. (see Table 5).

Antibiotic Prophylactic Prescription Challenges

Most dentist report recommendations from other medical providers to prescribe as being the biggest challenge when making decisions about antibiotic prescribing (47%). (See Figure 2). Almost 40% of dentists report patients taking antibiotics on their own and patient or family demand as being challenges to antibiotic prescription decisions. 24% of dentist report no challenges when making decisions about antibiotic prescribing.

Common Reference Guidelines for Dentist for Antibiotic Prescriptions

There are several guidelines that can be referenced regarding prescription of antibiotics. The survey asked dentists to select all guidelines they use. Possible options were the American Dental Association (ADA), American Academy of Pediatric Dentistry (AAPD), American Heart Association (AHA), American Academy of Orthopedic Surgeons (AAOS), and American Association of Endodontists (AAE). Of the 465 dentists who completed this question, 83% reference the ADA, 78% use AHA, 47% reference AAOS, 14% use AAPD, 13% use AAE, and 2% do not use any guidelines.

Of the dentists who both report prescribing antibiotics for prosthetic joints, the following trends were noted: Of the dentists who follow ADA guidelines (n=380), 76% report prescribing antibiotics for high-risk patients with prosthetic joints; Of those who follow AAPD guidelines (n=59), 66% report prescribing for prosthetic joints; Of the dentists who follow AHA guidelines (n=355), 80% report prescribing for prosthetic joints; Of the dentists who follow AAOS guidelines (n=213), 78% of dentists report prescribing for prosthetic joints; Of the dentists who follow AAE guidelines (n=57), 10% of dentists report prescribing for prosthetic joints.

Compliance with Opioid Guidelines

PA state guidelines for opioid prescriptions in the dental setting say that NSAIDs are the recommended first line therapy and that a combo of NSAIDs and acetaminophen can provide additional relief if acetaminophen can be taken by the patient. (See Figure 3). Ibuprofen is an NSAID. Approximately 51% of dentists use

ibuprofen-acetaminophen combinations and 38% use NSAIDs as first-line analgesic therapies. Approximately 4% use opioids, 5% use acetaminophen, 1% don't use anything, and less than 1% use steroids or antibiotics.

It is recommended that opioids should be prescribed no more than three days. Nearly 83% of dentists prescribe opioids for 1-3 days, 16% for 4-7 days, and less than 1% for 8 or more days (Figure 4).

Safe disposal information for unused opioids should always be provided to prevent misuse or diversion. Approximately 23.8% percent of dentists always provide safe disposal information (Figure 5). Approximately 30% never provide safe disposal information and 20% rarely provide safe disposal information.

Dentists should always check the Prescription Drug Monitoring Program (PDMP) before prescribing a controlled substance. Nearly 50% of dentists always check the PDMP before prescribing controlled substances (Figure 6). However, approximately 8% rarely check the PDMP, 11% are not registered and never check the PDMP, and 9% are registered but never check the PDMP.

Of the dentists who always provide safe disposal information 71% always check the PDMP. Of the dentists who do not always provide safe disposal 58% do not always check the PDMP.

Opioid Prescribing Challenges

Most dentists were challenged by patient and family demand when prescribing opioids (48%). (See Figure 7). Around 30% responded that patients taking opioids on their own was a major challenge. Another 30% never experienced challenges when prescribing opioids. Of the dentists who reported patient and family demand as a challenge, 79% did not always provide safe disposal information as recommended by guidelines.

Common Reference Guidelines for Dentist for Opioid Prescriptions

The survey asked about common guidelines referenced for prescribing opioid medications. Possible options were Johns Hopkins University Center for Opioid Research and Education (CORE), American Dental Association (ADA) Policy on Opioid Prescribing, and the Commonwealth of Pennsylvania. Of the 412 dentists who responded, 67% (n=277) of dentist reference the ADA Policy on Opioid Prescribing, 35% (n=145) use the Commonwealth of Pennsylvania, 17% (n=71) do not reference any guidelines, and only 3% (n=13) use Johns Hopkins University CORE.

Supporting Judicious Antibiotic and Opioids Prescribing Practices

Around 70% of dentists felt that the Allegheny County Department or Pennsylvania Department of Health could support judicious antibiotic and opioid

prescribing by distributing guidelines. (See Figure 8). Approximately 50% chose creating an email list for updates on current guidelines and resources as an appropriate support mechanism, and 40% said distributing education materials for patients and families and for providers as well.

Of the dentists who reported patient and family demand as a challenge when deciding whether or not to prescribe opioids, 71% reported that distributing guidelines would help support judicious antibiotic and opioid prescribing practices, 50% responded an email list, 40% chose a toolkit, 48% chose education material for patients, and 46% reported education material for providers.

Table 1. Demographic Characteristics of Dentists Participating in the 2020 Dental Prescribing Survey (n=473)

	Frequency (n)	Percent (%)
Practice Type		
Academic Practice	35	8
Government Facility	6	1
Group Practice	133	29
Long-term Care Facility	1	0.2
Single Provider Practice	282	61
Other Practices	9	2
Missing	7	~
Medicaid		
Yes	133	29
No	321	71
Missing	19	~
Specialty		
General	346	73
Endodontics	18	4
Oral and maxillofacial surgery	35	7
Orthodontics	21	4
Pediatric dentistry	25	5
Periodontics	25	5
Prosthodontics	26	5
Missing	2	~
Average Hours Per Week		
Part-time	52	11
Full-time	419	89
Missing	2	~
Number of Years in Practice		
Fewer than 5 years	16	3
5-10 years	21	4
11-20 years	61	13
21-30 years	95	20
Greater than 30 years	277	59
Missing	3	~

PROPHYLACTIC ANTIBIOTIC GUIDELINE COMPLIANCE

Table 2: Percent of Dentists Who Report Prescribing Prophylactic Antibiotics for Invasive Dental Procedures

	Percent (%)				
Procedure Type	**Total**	**Accept Medicaid**	**Do Not Accept non-Medicaid**	**Greater than 30 years in practice**	**Less than or equal to 30 years in practice**
	(n=441)	**(n=126)**	**(n=299)**	**(n=259)**	**(n=181)**
Compliant Responses					
Dental extractions	83	83	82	83	83
Periodontal procedures	72	64	76	74	70
Dental implant placement	63	63	63	59	69
Non-Compliant Responses					
Root canal therapy	53	45	57	49	59
Supra-gingival scaling	33	29	33	31	35
Routine anesthetic injections (no infected tissue)	20	17	21	19	22
Placement of a direct restoration such as crown cementation	19	14	19	19	18

Table 3: Percent of Dentists Who Report Prescribing Prophylactic Antibiotics for High-Risk Medical Conditions

	Percent (%)				
Condition Type	**Total**	**Accept Medicaid**	**Do Not Accept non-Medicaid**	**Greater than 30 years in practice**	**Less than or equal to 30 years in practice**
	(n=449)	**(n=123)**	**(n=309)**	**(n=266)**	**(n=181)**
Compliant Responses					
Cardiac transplantation with valve regurgitation due to a structurally abnormal valve	86	85	86	89	81
Previous infective endocarditis	81	82	80	80	82
Prosthetic cardiac valves or valve repair with prosthetic material	80	80	80	82	76
Repaired congenital heart defect with residual shunt or valvular regurgitation at/adjacent to the site of a prosthetic patch/device	77	79	77	77	78
Unrepaired cyanotic congenital heart disease	58	67	56	56	62
Non-Compliant Responses					
Mitral valve prolapse	27	24	28	29	23
Any congenital heart disease	26	23	28	29	20
Prosthetic joint(s)	78	64	83	79	76

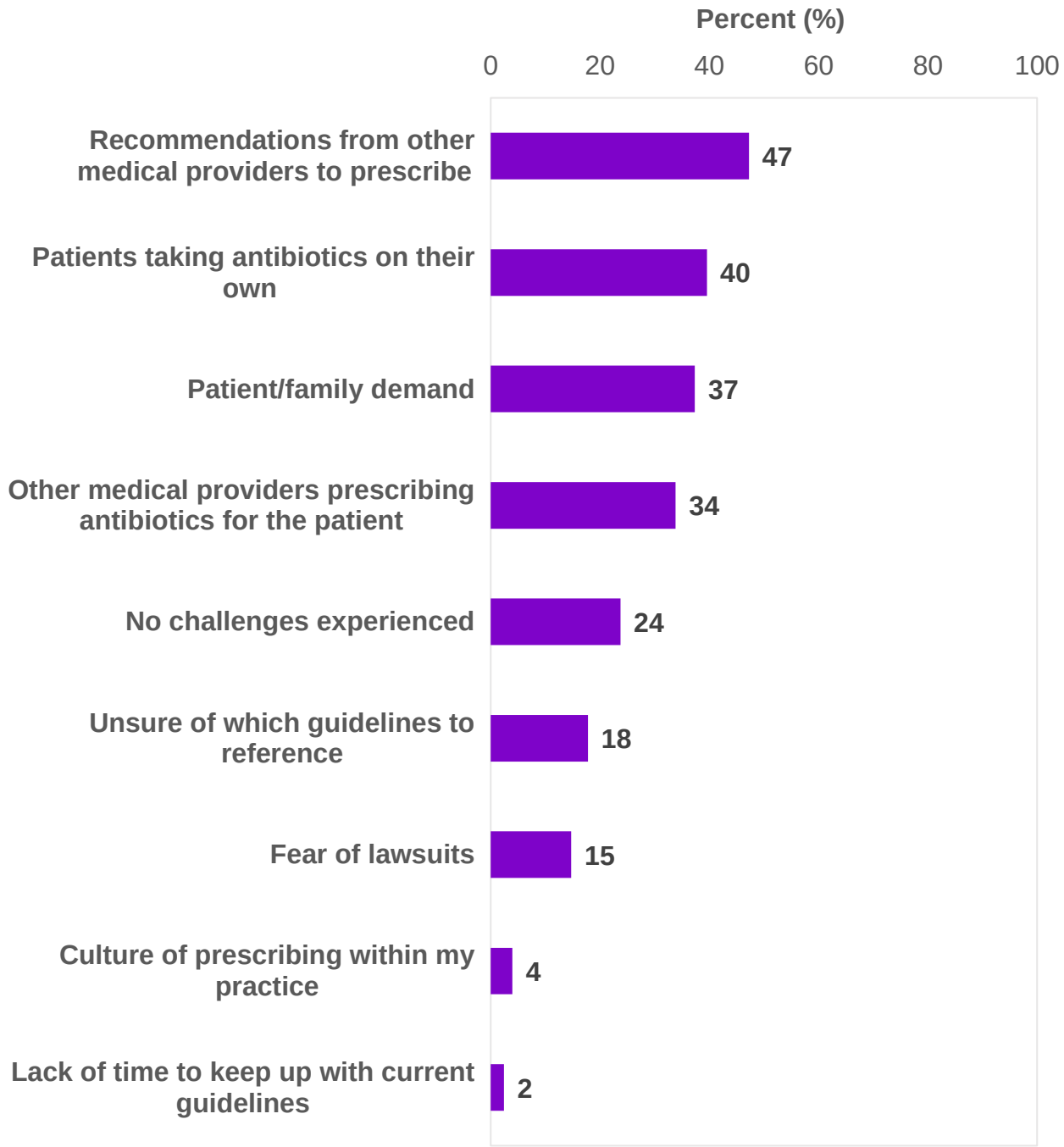
Table 4: Frequency of Dentists by Specialty Prescribing Antibiotics for Root Canals for Patients with High-Risk Conditions

Specialty	Number of Dentists Prescribing Antibiotics for Root Canals (%)
Endodontics	13 (72)
Prosthodontics	17 (71)
General	197 (60)
Pediatric dentistry	11 (48)
Orthodontics	4 (25)
Periodontics	5 (22)
Oral and maxillofacial surgery	6 (17)

Table 5: Frequency of Dentists by Specialty Prescribing Antibiotics for High-Risk Patients with Prosthetic Joints

Specialty	Number of Dentists Prescribing Antibiotics for Patients with Prosthetic Joints (%)
Endodontics	14 (82)
Prosthodontics	19 (76)
General	277 (82)
Pediatric dentistry	15 (71)
Orthodontics	11 (65)
Periodontics	17 (68)
Oral and maxillofacial surgery	28 (82)

Figure 2: Percent of Dentist Who Report Challenges When Making Decisions About Antibiotic Prescriptions (n= 455)



COMPLIANCE WITH OPIOID GUIDELINES

Figure 3: Percent Distribution of Dentists Most Used First-Line Analgesic Therapy for Patients With Acute Dental Pain (n= 358)

***correct answers**

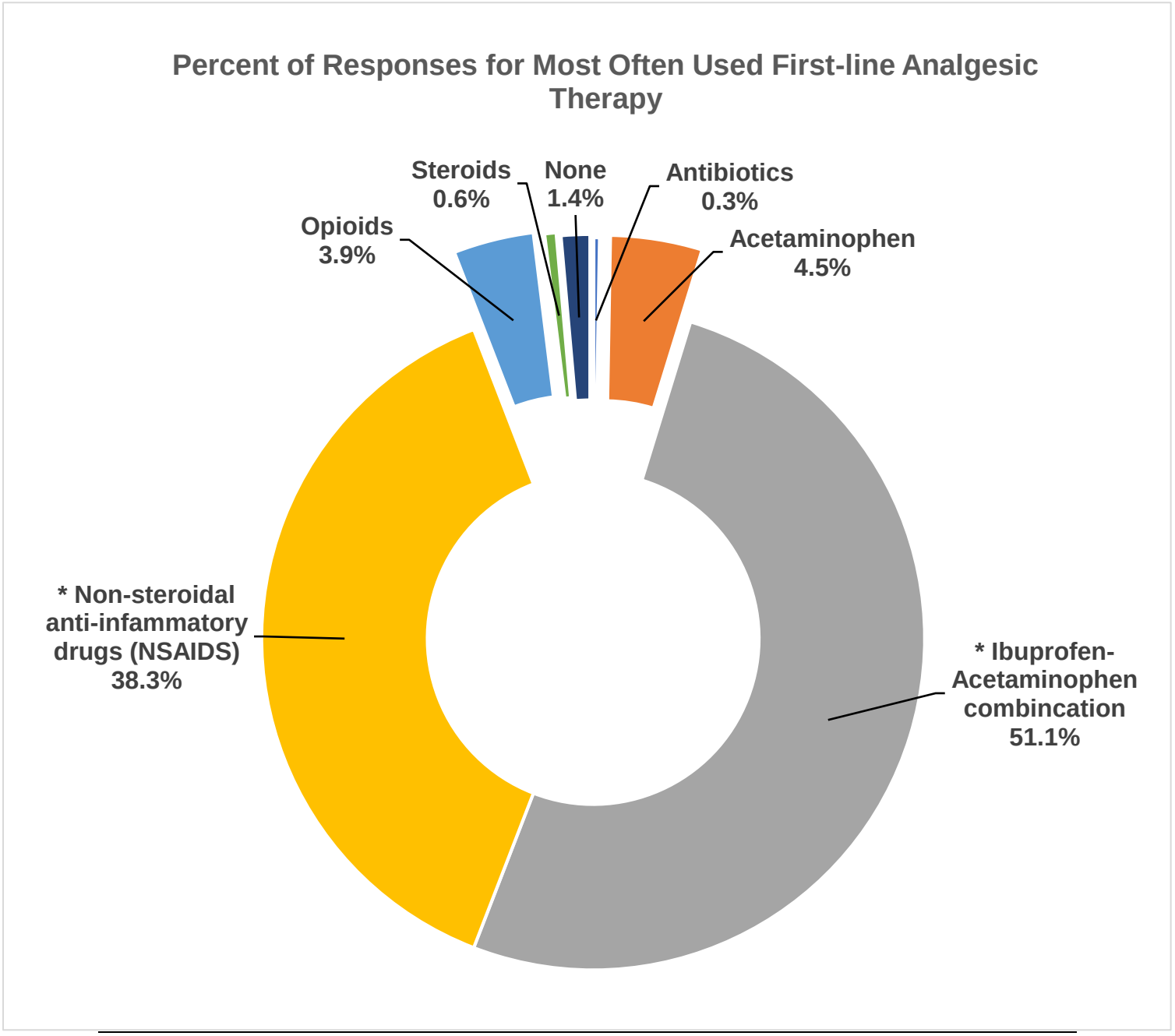


Figure 4: Percent Distribution of the Average Number of Days Dentists Report Prescribing Opioid Supply (n= 388)

***correct responses**

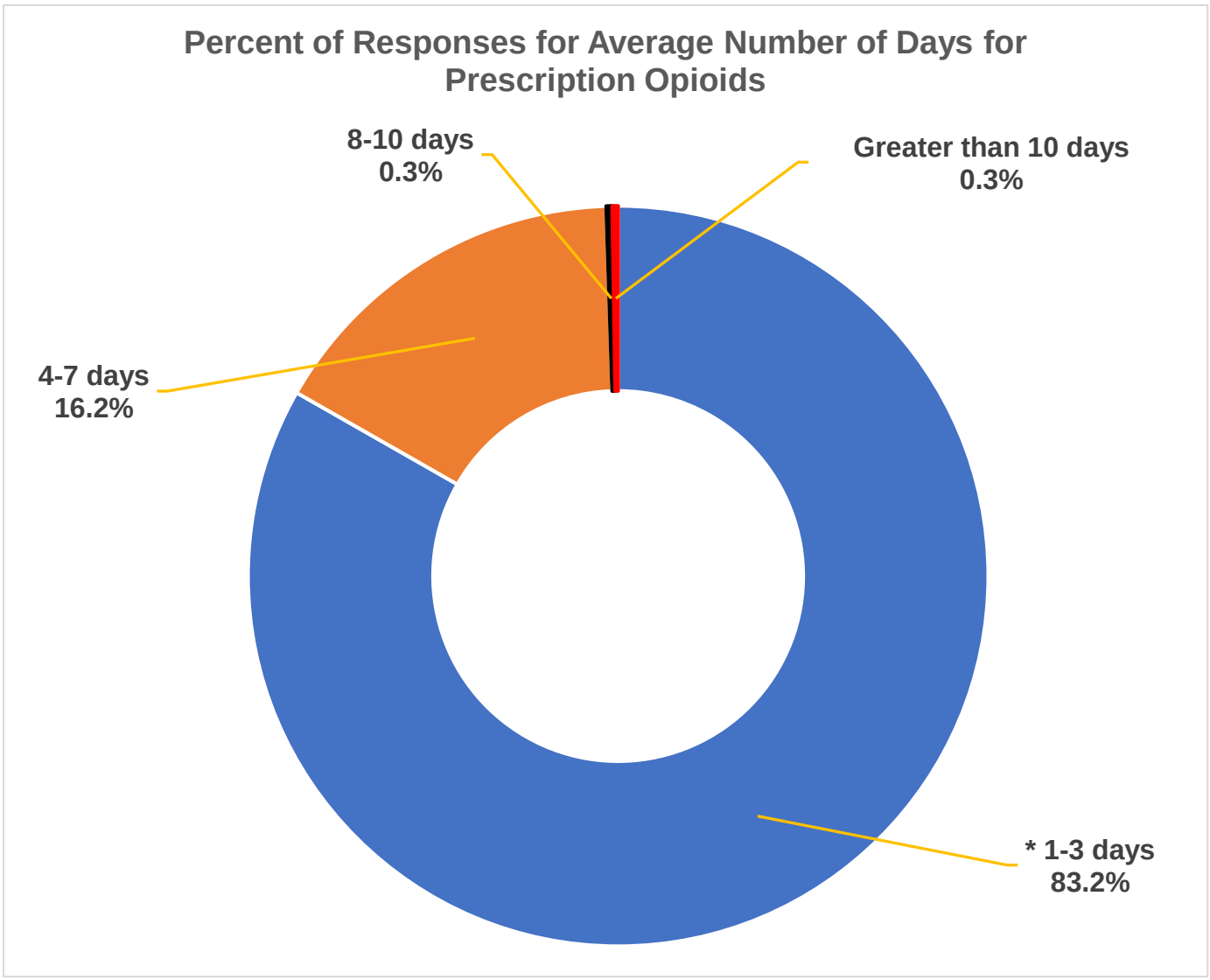


Figure 5: Percent Distribution of How Often Dentists Provide Safe Disposal Information for Unused Medication (n=391)

***correct responses**

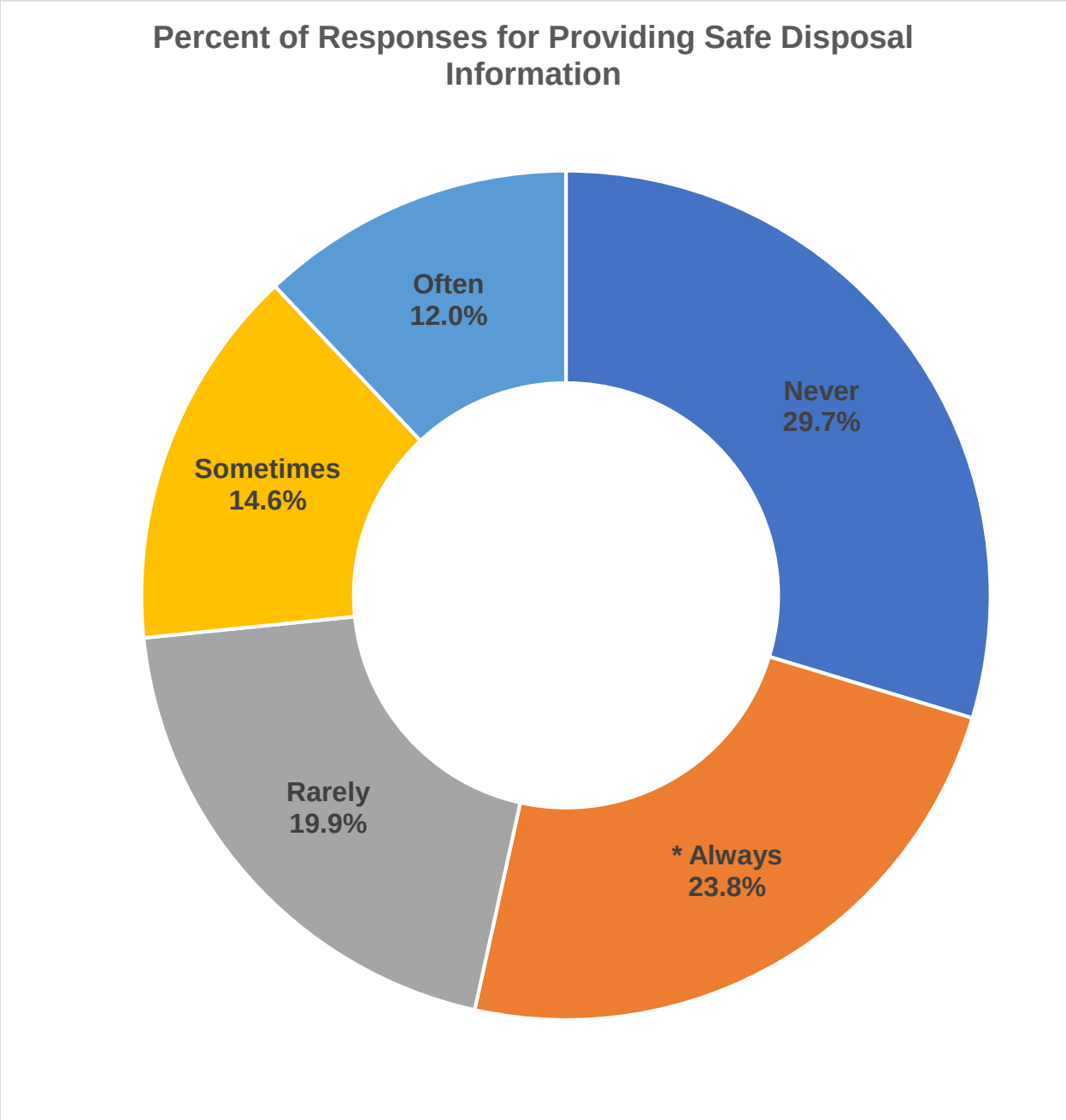


Figure 6: Percentage of Dentists Who Check the Prescription Drug Monitoring Program Before Prescribing Controlled Substances

(n= 421)

***correct responses**

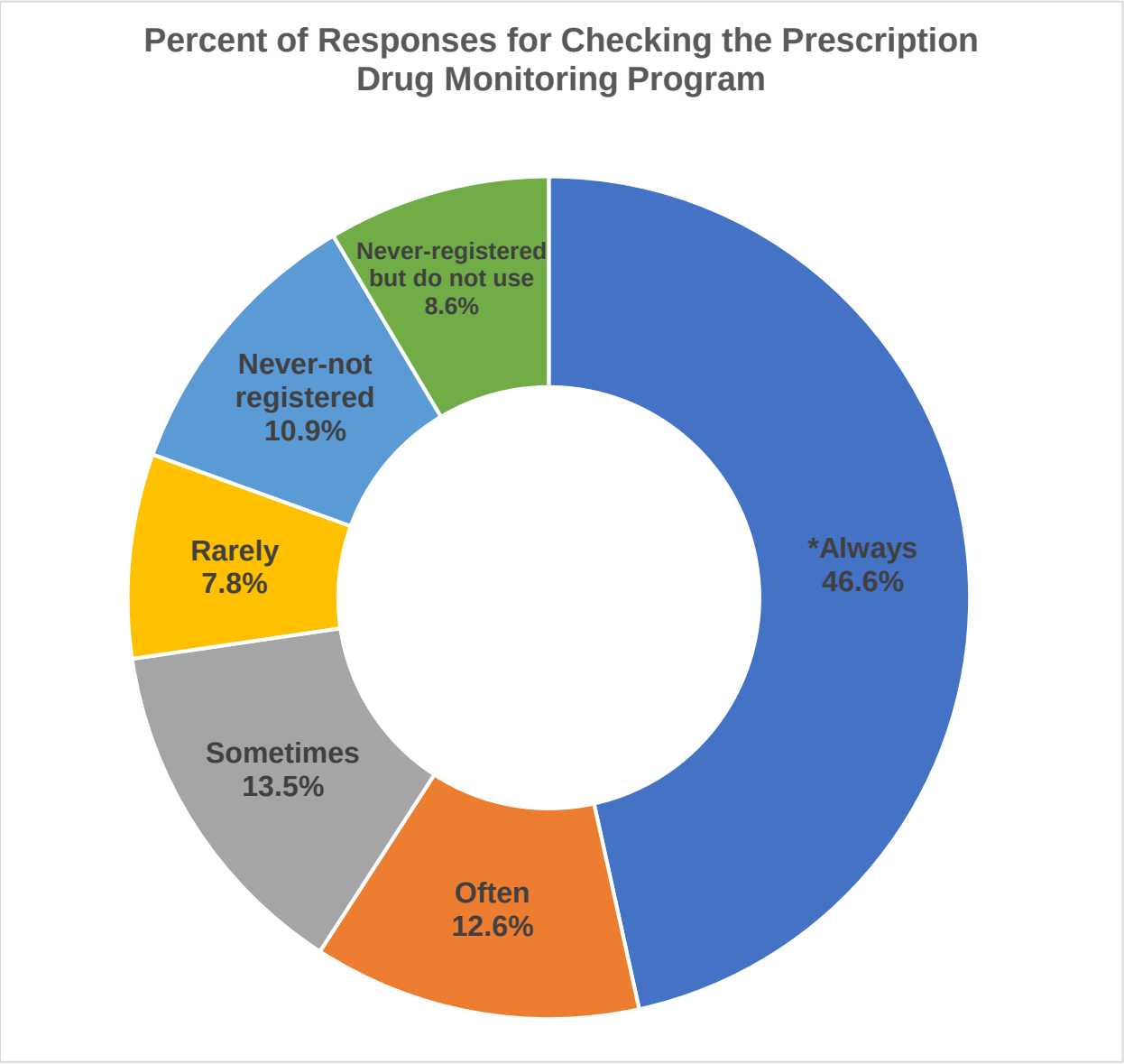


Figure 7: Percent of Dentist Who Report Challenges When Making Decisions about Opioid Prescriptions (n= 408)

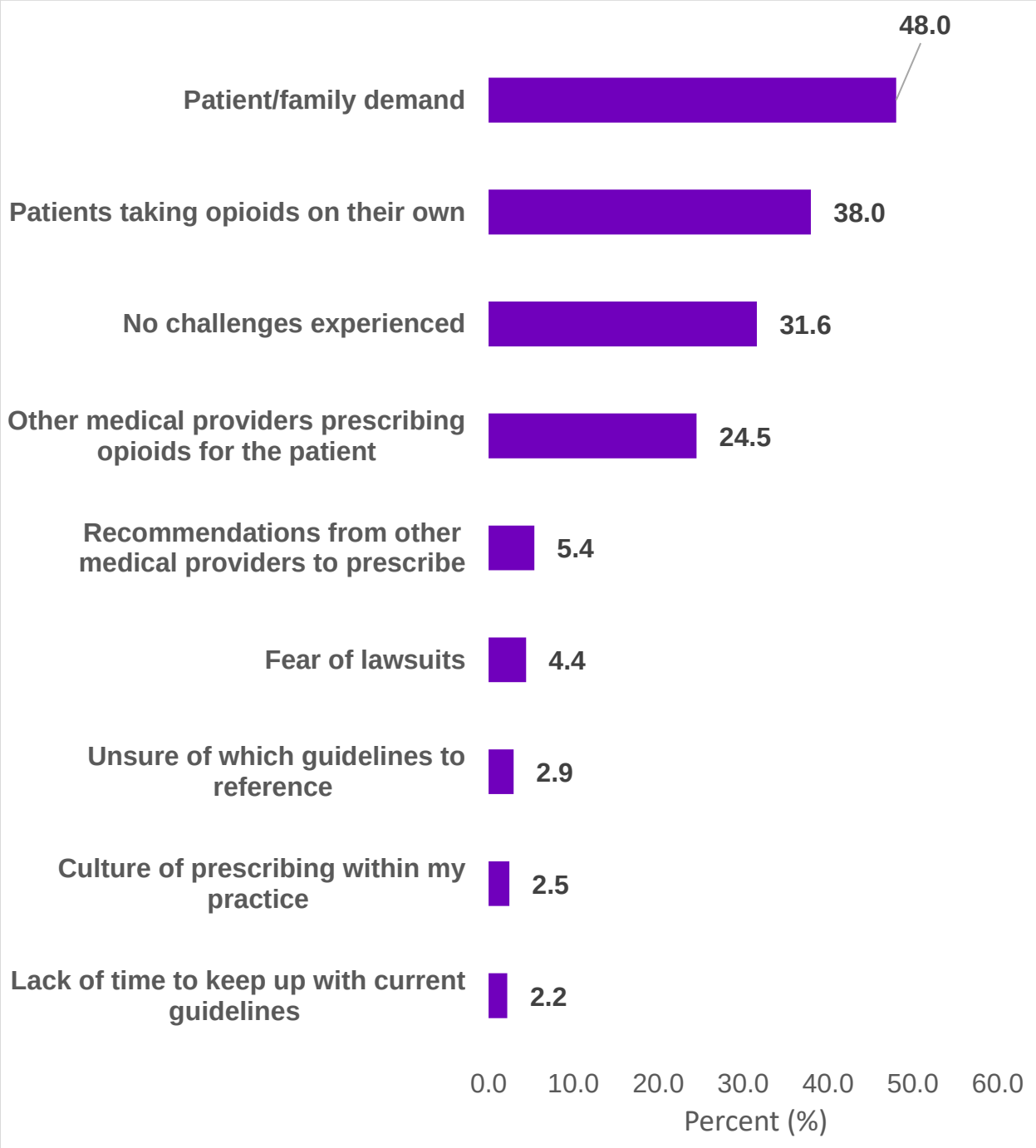
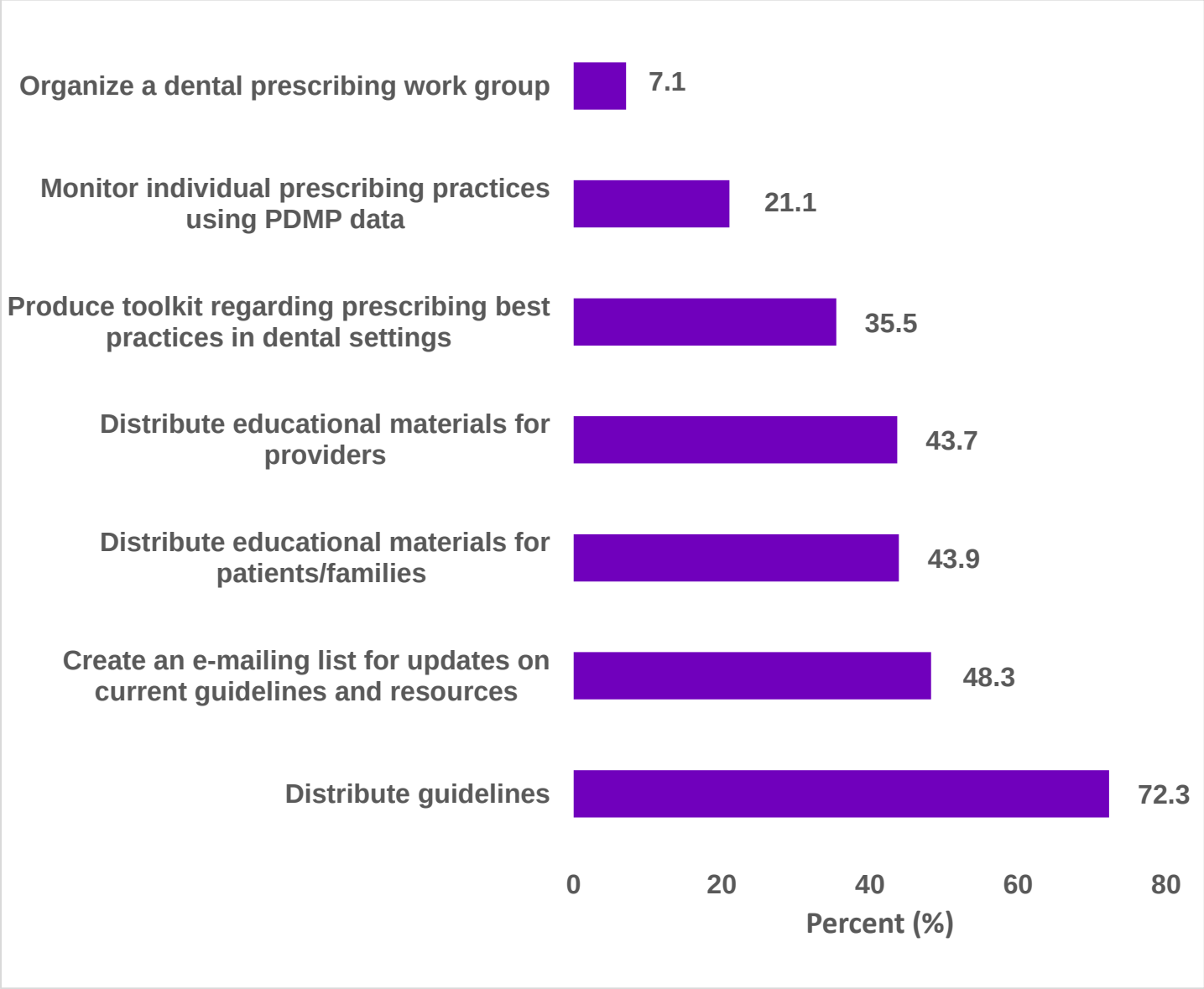


Figure 8: Percent Distribution of Responses on How the Allegheny County Health Department or The Pennsylvania Department of Health Can Support Judicious Antibiotic and Opioid Prescribing in the Dental Setting (n= 437)



DISCUSSION

The present study sought to examine current antibiotic and opioid prescribing practices in Allegheny County dental offices and support future research and initiatives related to dental care, antibiotic stewardship, and opioid overuse prevention. The study results demonstrate that most dentists prescribe antibiotics and opioid as recommended, but there is some deviation from the recommendations and differences in prescribing practices by clinical characteristics of the dental office.

Dentists in this study report following guidelines when prescribing antibiotics for procedures like dental extractions, periodontal procedures, and dental implant placements. A lower percentage of all dentists prescribe antibiotics for dental implant placements. A large percentage of dentists reported prescribing antibiotics for root canals, which is not recommended by guidelines. Dentists who do not accept Medicaid and those who have practiced 30 years or less prescribed antibiotics for root canals in greater percentages than their counterparts (dentists who accept Medicaid and dentists who have practiced more than 30 years). Specialists like endodontists, prosthodontists, and general specialists reported prescribing antibiotics for this procedure in higher percentages than other specialties. It is not uncommon for endodontists to overprescribe antibiotics for root canals as studies have shown that root canals play a role in antibiotic over prescription during endodontic treatment. [18,19] There is less known about antibiotic over prescription for root canal therapy across dental specialties and by clinical characteristic of dentists. There is a need for more clear and specific guidelines for root canal therapy, especially among newer dentists and those who specialize in fields where root canals are more common.

Dentists follow guidelines when prescribing antibiotics for patients which high-risk medical conditions, although a lower percent report prescribing for unrepaired cyanotic congenital heart disease. The greatest deviance from guidelines for antibiotic prescriptions is for patients with prosthetic joint implants. More than half of all dentists in the study reported prescribing antibiotics for this condition. In addition, more than half of dentists in each specialty reported prescribing antibiotics for this condition. Dentists who do not accept Medicaid prescribed antibiotics for patients with prosthetic joints in greater percentages than dentists who accept Medicaid. There is a clear lack of compliance with this guideline across clinical characteristics and overall. This deviance from guidelines could be due to provider usage of outdated guidelines. Prior to 2007, prophylaxis guidelines supported antibiotic prescriptions for patients with prosthetic joint implants, but these guidelines were revised in 2007 and 2013.[20] Dentists may not be aware of these guidelines or perhaps dentists do not adhere to these guidelines irrespective of their awareness of the changes. There is evidence that a greater percentage of dentists who follow ADA, AHA, and AAOS guidelines prescribe antibiotics for patients with prosthetic joint implants more than those who follow other guidelines. There should be further initiatives for provider education on guidelines for patients with prosthetic joints across all available reference guidelines. It is also of the utmost

importance that there is consensus on new guidelines among dental providers. Adherence to the guidelines for the use of antibiotic for patients with prosthetic joints is needed in order to support judicious antibiotic prescribing practices, reduce overprescribing of antibiotics, and prevent antibiotic resistance.

Most providers followed recommended opioid guidelines for first-line therapies, average days to prescribe opioids, and checking the Prescription Drug Monitoring Program before prescribing controlled substances. There was inconsistency in adherence to guidelines to always provide safe disposal information for unused medication. A large percentage of dentists report never providing safe disposal information. To prevent opioid diversion and misuse, there should be more provider education around the importance of providing safe disposal information to patients for unused medication.

The challenges experienced for dentists when making decisions about antibiotic and opioid prescriptions were quite similar. Many dentists were challenged by recommendations from other medical providers to prescribe antibiotics, patients taking their own antibiotics, patient and family demand, and other medical providers prescribing antibiotics for the patient when making decisions about antibiotic prescriptions. The greatest challenges reported for prescribing opioids included patient and family demand, patients taking opioids on their own, and other medical providers prescribing opioids for the patient. A large percent of dentists also reported never experiencing a challenge. In order to support judicious prescribing practices among dentists, there should be more education given to patients and non-dental providers around antibiotic and opioid prescribing guidelines in the dental setting.

The most useful form of support the PA DOH and ACHD can provide is through the distribution of guidelines. Dentists also reported in large percentages that an email list on updates about current guidelines, education material for parents and family, and education materials for providers would be other useful forms of support from ACHD and the PA DOH. Further support through these mechanisms is key to furthering initiatives around antibiotic stewardship and opioid overuse prevention.

This study is limited by provider response rate and lack of demographic data. Though the response rate was 47%, which is reasonably high, the surveys that were undeliverable made up a significant proportion of the total administered surveys thereby leading to potential non-response bias. Those who completed the survey may have had different practice experience or knowledge of guidelines than those who weren’t captured in this study. A list of current and frequently updated contact information for dentists in Allegheny County would allow for a more representative assessment of dental prescribing practices in the future. The administered survey did not include information on race, sex, and academic background of the dentists which limited further analyses.

Despite the limitations, this study had a strong response rate primarily because of the use of paper surveys coupled with follow-up calls and reminders. In addition, the survey used in this study was reviewed by dentists prior to administration, contained survey questions from other studies, and used double-data entry for data collection. These practices improved data collection and data analysis.

The ACHD proposed and administered a dental provider survey to assess awareness of and compliance with ADA-supported antibiotic prophylaxis and opioid prescribing guidelines. This study aimed to understand current prescribing practices in Allegheny County dental offices, reiterate the importance of following best-practice guidelines, and support future research/initiatives related to dental care in Pennsylvania. Most dentists in the survey followed antibiotic and opioid prescribing guidelines. Despite strong compliance overall, there is weak adherence to guidelines on prescribing antibiotics for patients with prosthetic joints and providing safe disposal information for unused medication. These shortcomings in prescribing practices may significantly contribute to the development of antibiotic resistance and opioid diversion. It is crucial for there to be further education on prescribing practices for patients with prosthetic joints and initiatives to raise awareness of the importance of safe disposal information. These survey results will be shared with the PA DOH to further dental stewardship programs. Furthermore, these results add to limited literature on prescribing practices of dentists in Allegheny County and can be used to support future research endeavors.

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APPENDIX

Appendix A. Survey of Adherence to Antibiotic Prophylaxis and Opioid Prescribing Guidelines Among Dentists Practicing in Allegheny County

Antibiotic and Opioid Prescribing Survey for Allegheny County Dentists

Thank you for taking the time to complete this short survey regarding antibiotic and opioid prescribing practices at your dental office. Your responses will help us develop new initiatives to support judicious prescribing of antibiotics and opioids which could benefit your patients. This survey is being conducted by the Allegheny County Health Department.

Instructions:

We ask that each licensed dentist at your facility complete this survey. It should not take more than 5 minutes to complete. Your individual responses are anonymous and will not be shared with anyone. Only aggregate (summary) results will be presented. Surveys can be returned the following ways:

- Mail: use the enclosed pre-paid postage envelope
- Online: visit https://achd.checkboxonline.com/DPS or scan QR code
- Fax: 412-578-8025 (please set fax to two-sided original so we receive all pages)

Please contact Molly Nace (email: molly.nace@alleghenycounty.us, phone: 412-578-8370) with any questions.

Thank you,

Bureau of Assessment, Statistics,
and Epidemiology Allegheny
County Health Department

Practice and Provider Characteristics

Do you practice in Allegheny County? *(only complete the survey if yes)*

- ○ Yes
- ○ No

Which of the following best describes the practice for which you work?

- ○ Single provider practice
- ○ Group practice
- ○ Academic practice (i.e. dental school)
- ○ Long-term care facility
- ○ Government facility (e.g. VA)
- ○ Public health department
- ○ Other *(specify)*: ___

Does the practice for which you work accept Medicaid?

- ○ Yes
- ○ No

What is your area of specialty? *(check all that apply)*

- ☐ General dentistry
- ☐ Endodontics
- ☐ Oral and maxillofacial surgery
- ☐ Orthodontics
- ☐ Pediatric dentistry
- ☐ Periodontics
- ☐ Prosthodontics
- ☐ Other *(specify)*: ___

Do you currently practice at least 20 hours per week on average in the clinical setting?

- ○ Yes
- ○ No

How many years have you been practicing dentistry?

- ○ Fewer than 5 years
- ○ 5-10 years
- ○ 11-20 years
- ○ 21-30 years
- ○ Greater than 30 years

Antibiotic Prescribing Practices

For certain patients with high-risk medical conditions, for which dental procedures would you prescribe or recommend prophylactic antibiotics? *(check all that apply)*

- ☐ Routine anesthetic injections (no infected tissue)
- ☐ Supra-gingival scaling
- ☐ Periodontal procedures
- ☐ Root canal therapy
- ☐ Dental implant placement
- ☐ Placement or removal of orthodontic bands/appliances
- ☐ Dental extractions
- ☐ Placement of a direct restoration such as crown cementation
- ☐ Other *(specify)*:

For patients with which high-risk medical conditions would you prescribe or recommend prophylactic antibiotics before or immediately following certain invasive dental procedures? *(check all that apply)*

- ☐ Any congenital heart disease
- ☐ Cardiac transplantation with valve regurgitation due to a structurally abnormal valve
- ☐ Prosthetic joint(s)
- ☐ Unrepaired cyanotic congenital heart disease
- ☐ Repaired congenital heart defect with residual shunt or valvular regurgitation at/adjacent to thesite of a prosthetic patch/device
- ☐ Previous infective endocarditis
- ☐ Mitral valve prolapse
- ☐ Prosthetic cardiac valves or valve repair with prosthetic material
- ☐ Other *(specify)*:

How often do other providers such as primary care physicians, orthopedists, and cardiologists prescribe antibiotics for your patients before dental procedures?

- ○ Never
- ○ Rarely
- ○ Sometimes
- ○ Often

- ○ Always

How often do patients take their own antibiotics (such as from previous procedures or conditions) without a prescription from you before invasive dental procedures?

- ○ Never
- ○ Rarely
- ○ Sometimes
- ○ Often
- ○ Always
- ○ Unknown

What challenges, if any, do you experience when making decisions about antibiotic prescribing? *(check all that apply)*

- ☐ Patient/family demand
- ☐ Recommendations from other medical providers to prescribe
- ☐ Other medical providers prescribing antibiotics for the patient
- ☐ Patients taking antibiotics on their own
- ☐ Unsure of which guidelines to reference
- ☐ Lack of time to keep up with current guidelines
- ☐ Fear of lawsuits
- ☐ Culture of prescribing within my practice
- ☐ No challenges experienced

_____

_____

- ☐ Other *(specify)*: ___

Which of the following guidelines do you reference when considering prescribing antibiotics? (*check all that apply)*

- ☐ American Dental Association (ADA)
- ☐ American Academy of Pediatric Dentistry (AAPD)
- ☐ American Heart Association (AHA)
- ☐ American Academy of Orthopedic Surgeons (AAOS)
- ☐ American Association of Endodontists (AAE)
- ☐ None
- ☐ Other *(specify)*:____

Opioid Prescribing Practices

Which type of medication do you <u>most often</u> use as first-line analgesic therapy (not prophylaxis) for patients with acute dental pain?

- ○ Steroids
- ○ Non-steroidal anti-inflammatory drugs (NSAIDs)
- ○ Opioids
- ○ Acetaminophen
- ○ Ibuprofen-Acetaminophen combination
- ○ Other *(specify)*: ___

How often do you prescribe opioids for pain management after the performance of third

molar extractions?

- ○ Never
- ○ Rarely
- ○ Sometimes
- ○ Often
- ○ Always
- ○ NA – I do not perform third molar extractions

When prescribing opioids, what is the <u>average</u> number of days for which you provide a supply?

- ○ 1-3 days
- ○ 4-7 days
- ○ 8-10 days
- ○ Greater than 10 days

When prescribing opioids, how often do you provide information about safe disposal of unused medication to prevent diversion or misuse?

- ○ Never
- ○ Rarely
- ○ Sometimes
- ○ Often
- ○ Always

How often do you check reports from the Prescription Drug Monitoring Program before prescribing a controlled substance?

- ○ Never - not registered
- ○ Registered but do not use
- ○ Rarely
- ○ Sometimes
- ○ Often
- ○ Always

What challenges, if any, do you experience when making decisions about opioid prescribing? *(check all that apply)*

- ☐ Patient/family demand
- ☐ Recommendations from other medical providers to prescribe
- ☐ Other medical providers prescribing opioids for the patient
- ☐ Patients taking opioids on their own
- ☐ Unsure of which guidelines to reference
- ☐ Lack of time to keep up with current guidelines
- ☐ Fear of lawsuits
- ☐ Culture of prescribing within my practice
- ☐ No challenges experienced
- ☐ Other *(specify)*: ____

Which of the following guidelines do you reference when considering prescribing opioid medications? *(check all that apply)*

- ☐ Johns Hopkins University Center for Opioid Research and Education (CORE)
- ☐ American Dental Association (ADA) Policy on Opioid Prescribing
- ☐ Commonwealth of Pennsylvania
- ☐ None
- ☐ Other *(specify)*:_____

Final Comments

In your opinion, how can the Allegheny County Health Department or the Pennsylvania Department of Health support judicious antibiotic and opioid prescribing in the dental practice for which you work? *(check all that apply)*

- ☐ Distribute guidelines
- ☐ Produce toolkit regarding prescribing best practices in dental settings
- ☐ Organize a dental prescribing work group
- ☐ Create an e-mailing list for updates on current guidelines and resources
- ☐ Distribute educational materials for patients/families
- ☐ Distribute educational materials for providers
- ☐ Monitor individual prescribing practices using PDMP data
- ☐ Other *(specify)*: _____

Any additional comments: