AI IN DENTISTRY:
ARE HYGIENISTS READY?

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METHODOLOGY

The data for this survey came from Alchemer, an online survey platform. Respondents were sent a link to an online survey programmed by ADHA staff who assessed their thoughts and attitudes around AI and how it can be used in clinical practice. The total number of respondents – both complete and incomplete – is 881. Of those, 283 (32.1%) were partially complete and were not included in the analysis. The total number of complete respondents as of Feb. 26, 2024, is 598, which was a 6.3% response rate.

This Joint Survey Report has been prepared for the express purpose of illuminating the perspectives, attitudes, and practices of dental hygienists regarding AI integration into oral health care. The information contained in this Report is based on information provided by the contributors and professional judgment of the contributors involved.

INTRODUCTION

This report delves into the findings of the AI in Dental Hygiene Survey, which aimed to illuminate the perspectives, attitudes, and practices of dental hygienists regarding AI integration into oral health care. Through a survey of 598 hygienists, the report explores their perceptions and experiences, providing a comprehensive understanding of how hygienists view AI adoption and the impact of AI on their field.

By examining hygienists' familiarity with AI technology, expectations for its impact on their work, and their concerns with utilizing it, this report sheds light on current sentiments within the dental hygiene community. As champions of patient-centered care, dental hygienists hold a unique vantage point when evaluating the potential impact of AI on clinical practice, patient outcomes, and professional development. Their insights, captured in this survey, contribute to a vital discussion that will shape the future of AI integration in dental hygiene.

EXECUTIVE SUMMARY

This executive summary captures the key findings of the AI in Dental Hygiene Survey, shedding light on respondents' knowledge, attitudes, and practices related to dental AI. These insights paint a picture of overall readiness of dental hygienists toward the adoption and utilization of AI technology in their profession.

1. **Awareness and Readiness for AI Technology:**
   Most hygienists surveyed aren't familiar with AI technology, and nearly half feel their practice is not prepared to adopt it.

2. **Perceived Impact of AI:**
   Diagnosis and claim submission were identified as the areas of dental practice most likely to be positively impacted by AI, according to respondents. Still, the majority believe that AI would have little to moderate impact on dentistry in the next 1-3 years.

3. **Impact on Hygienists' Workload:**
   Responses were divided regarding the impact of AI on dental hygienists' daily workload, yet the majority foresee a short-term increase in workload followed by long-term ease.

4. **Effect on Work Quality:**
   A significant majority believe that AI would improve efficiency, clinical effectiveness, or both, with a small number foreseeing a negative impact on work quality.

5. **Concerns About Replacement:**
   80.4% of respondents expressed no worry about AI replacing dental hygienists, instead seeing it as a tool to enhance their capabilities.

6. **Utilizing AI:**
   Hygienists are most excited to use AI for quantifying disease progression, earlier detection of diseases, and improved patient education. Many expressed concerns about cybersecurity and inaccuracy, with additional worries about declines in provider diagnostic skills and loss of diagnostic control.

SUMMARY OF DEMOGRAPHIC INSIGHTS

Demographic information was collected to gain an understanding of their education and experience in dentistry. Most of the respondents (68.7%) have a bachelor's degree or higher, and another 25.8% have an associate degree.

Generally, survey respondents are seasoned dental hygienists, with 76.5% having more than 11 years practicing, and the majority (55.9%) having 20 or more years of experience. Alternately, slightly less than 8% of the responding dental hygienists have been practicing for three years or less.

Approximately half of the hygienists surveyed (45.5%) practice in a private dental office, and 18.1% are in educational faculty or administrator roles.

EDUCATION

68.7%

Bachelor's Degree
Or Higher

25.8%
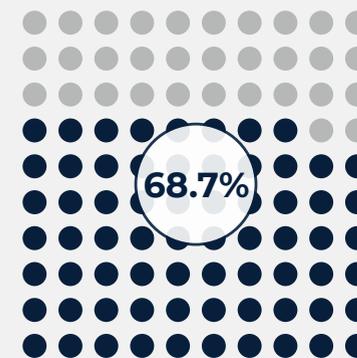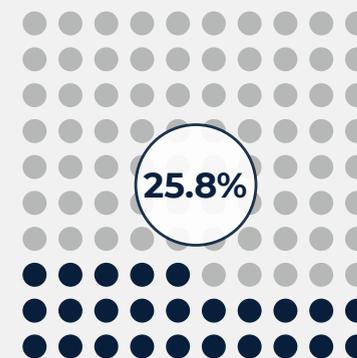
Associate's Degree

EXPERIENCE

76.5%

11 Years Of Experience

55.9%
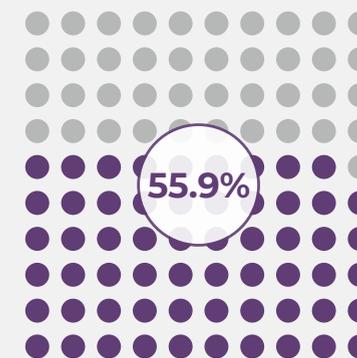
20 Or More Years Of
Experience

JOB

45.5%

Private Dental Practice

18.1%
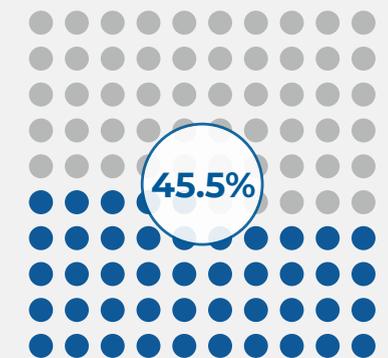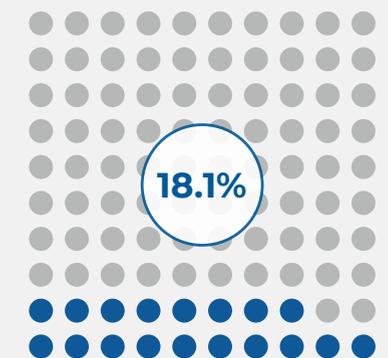
Educational Faculty Or
Administrator Roles

ANALYSIS OF SURVEY RESULTS

Familiarity with any technology can generate a greater sense of confidence in using it and oftentimes supports a faster journey to adoption as users move through the stages of change. By gauging dental hygienists' general awareness of dental AI technology, the survey gained insights into respondents' awareness, understanding, and perceptions of using dental AI.

Artificial intelligence in dentistry is growing in prevalence, offering clinicians an enhanced findings tool to assist and aid them in their diagnosis of diseases while maintaining their clinical autonomy. However, responses highlighted the ongoing opportunity to generate a broad awareness and understanding of the technology and its capabilities.

KNOWLEDGE OF DENTAL AI TECHNOLOGY

AWARENESS OF DENTAL AI TECHNOLOGY

(Tables 1-2)

Respondents to the AI in Dental Hygiene Survey noted low familiarity with dental AI technology generally, with the majority being not familiar or somewhat familiar.

When it comes to the availability of specific dental AI technology, there are a plethora of platforms across the industry. Respondents were asked to confirm which dental AI technology they are familiar with, noting AI:Dental, Pearl, Overjet, ORCA Dental AI, and Videa AI as options, with the opportunity to write in other technologies. Respondents identified three platforms with the highest recognition: 26.1% of respondents were familiar with AI:Dental, 20.4% with Pearl, and 19.2% with Overjet. Ninety percent of respondents confirmed they are not aware of any of the provided technologies.

Familiarity with dental

ARTIFICIAL INTELLIGENCE (AI) TECHNOLOGY:

BASE = 598

40.8% NOT FAMILIAR

36.8% SOMEWHAT FAMILIAR

14.4% MODERATELY FAMILIAR

6.4% VERY FAMILIAR

1.7% EXTREMELY FAMILIAR
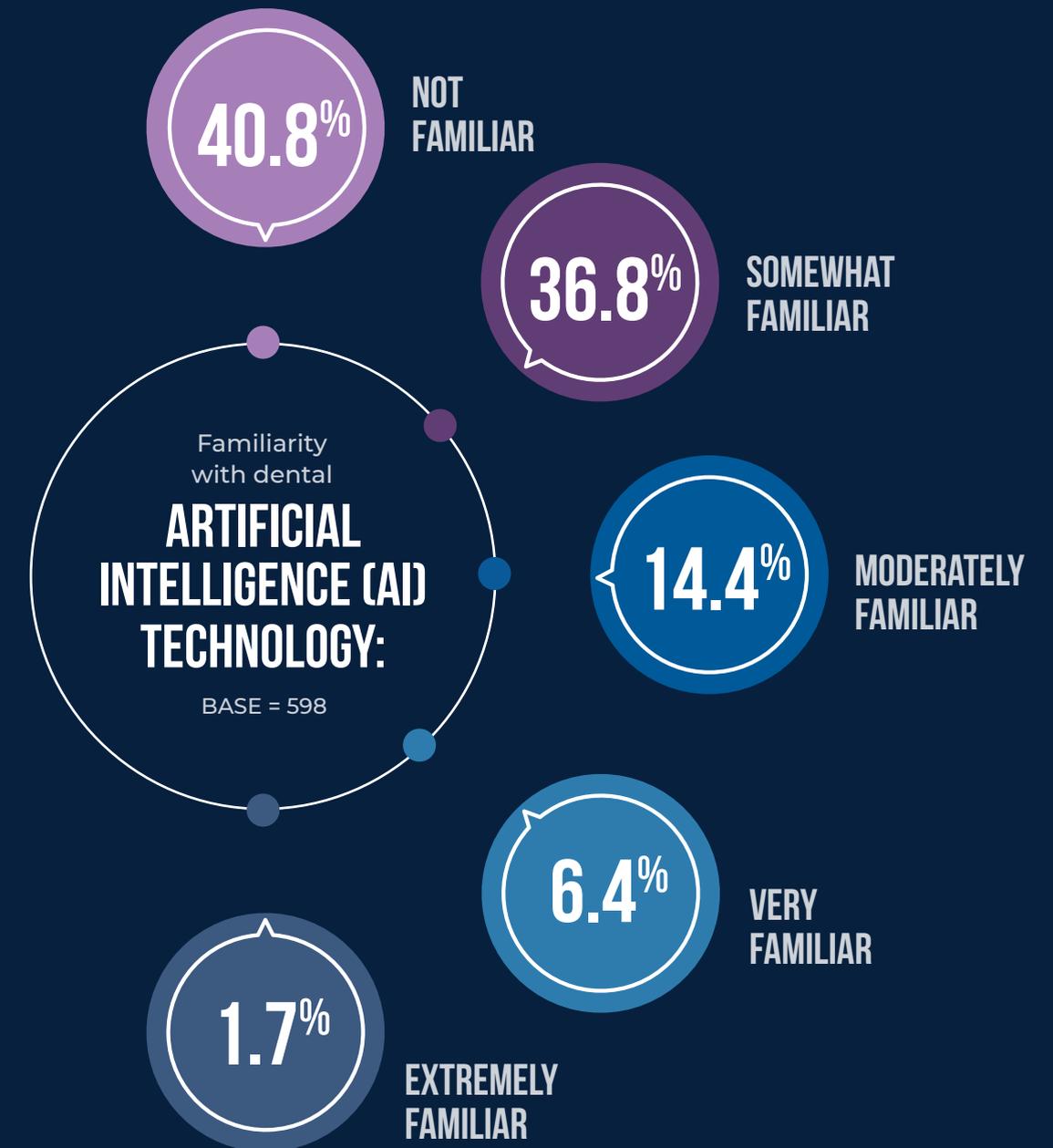
PERCEIVED IMPACT OF AI ON DENTAL PRACTICE

(Graphs 1-2, Table 3)

AI technology can be used across an abundance of activities in a dental practice by hygienists, doctors, and team members. Survey respondents were asked to select the top three activities they anticipated could be most positively impacted by dental AI.

Nearly 32% of respondents admitted uncertainty regarding which aspects of their daily activities could be positively impacted by dental AI, with 19% responding that none of the options could be positively impacted, again underscoring the opportunity for greater awareness and understanding of dental AI functionality.

Activity	Percentage
Diagnosis	58.7%
Claim submission	41.8%
Case acceptance	40.5%
Predicting disease progression	40.5%
Chart preparation/Team huddles	32.1%
Time savings	27.3%
Patient scheduling	24.6%
I don't know of any positives...	14.0%
Attracting new patients	13.2%
Other	7.4%

Note: Respondents were asked to select up to three responses.

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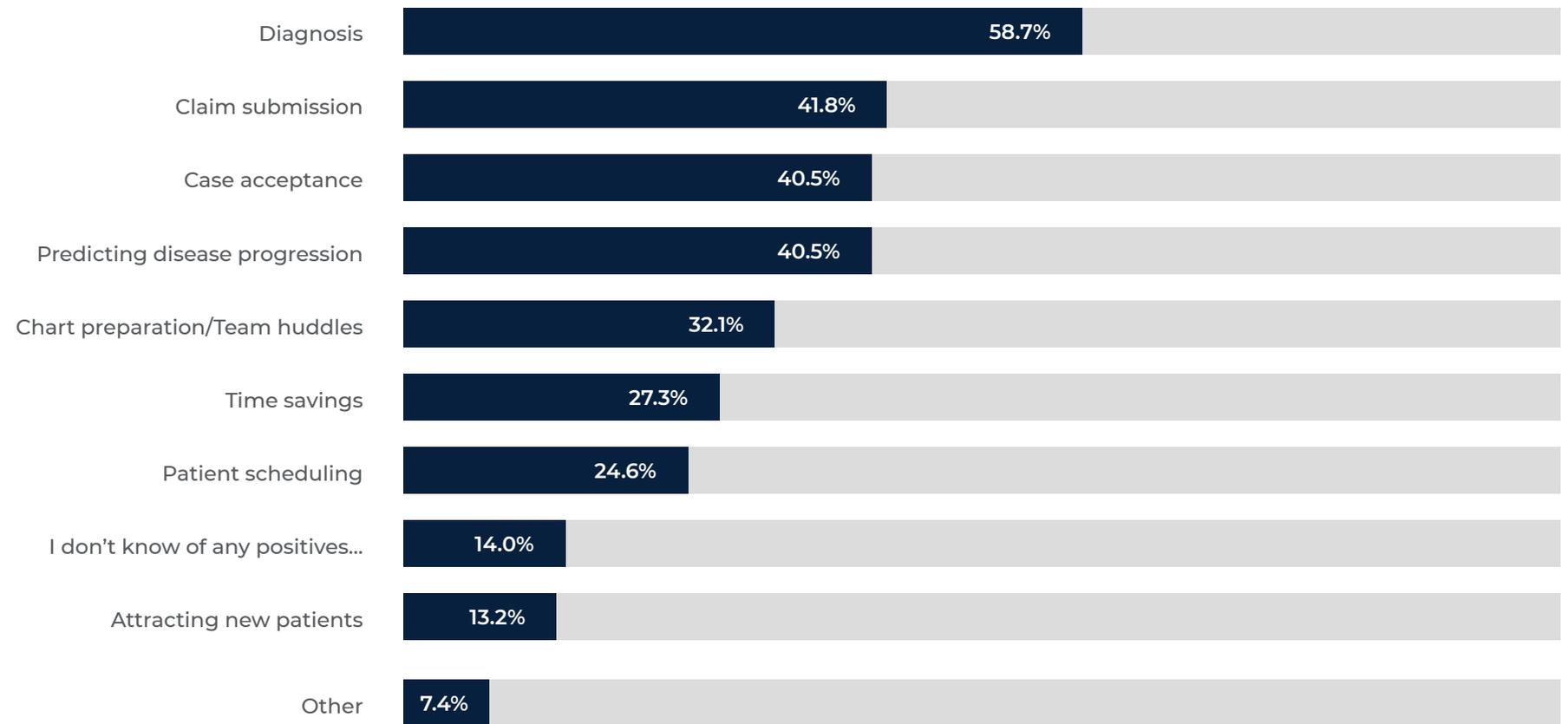
The survey also revealed the majority of respondents either expressed interest in or readiness for adopting this innovative technology into dental practices. A percentage of respondents (8.2%) is already using dental AI technology in practice, and a large majority expressed interest in varying degrees.
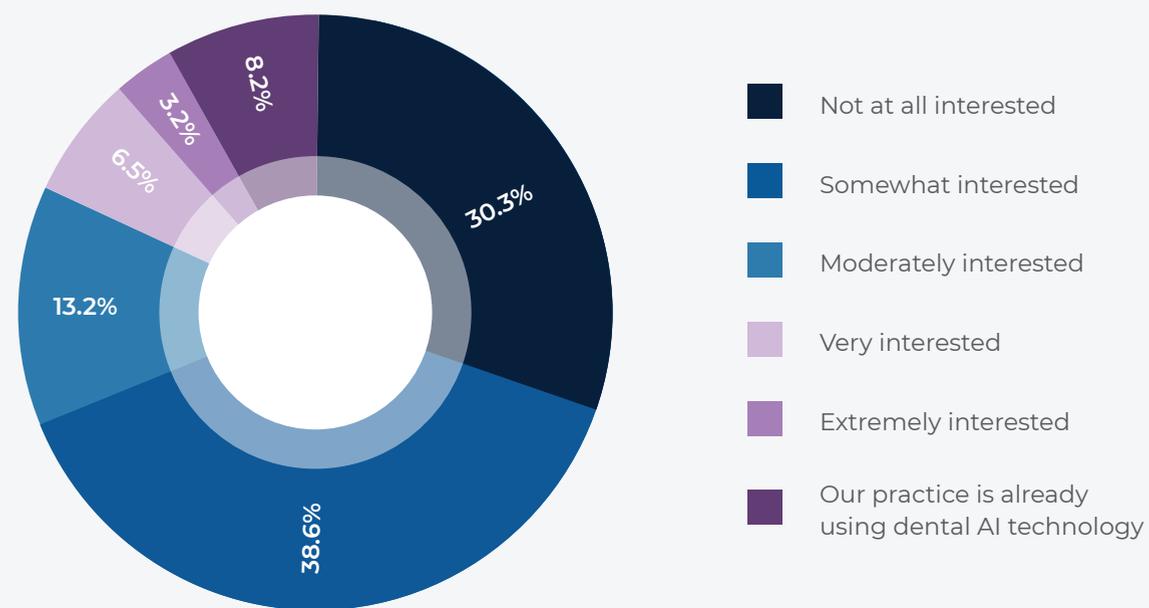
Approximately 10% (9.7%) of respondents said that their dental practice is either very or extremely interested in adopting AI technology, with another 8% already utilizing dental AI technology. Alternatively, 30% of respondents indicated that their dental practice is not at all interested, and 38.6% noted their practice is somewhat interested. When it comes to preparation for adopting dental AI, half of the respondents (50.2%) indicated that their dental practice is not at all prepared. Only 10% feel they are extremely or very prepared.

The perceived impact of dental AI in practice is a crucial component on the adoption journey. By understanding the practical use of dental AI, users are better positioned to increase their knowledge and buy-in for the technology in practice.

Not at all interested

Somewhat interested

Moderately interested

Very interested

Extremely interested

Our practice is already using dental AI technology

8% ALREADY UTILIZING DENTAL AI TECHNOLOGY

50% DENTAL PRACTICE IS NOT PREPARED TO ADOPT AI TECHNOLOGY

10% FEEL THEY ARE EXTREMELY OR VERY PREPARED

ATTITUDES TOWARD DENTAL AI TECHNOLOGY

The survey also delved into respondents' attitudes toward dental AI technology by understanding their perspective on the benefits, influence, and what excites and concerns them about utilizing this technology.

IMPACT OF AI
(Table 4)

In looking ahead in the short term (1-3 years), most respondents (59.7%) believe that AI will have little to moderate impact on dentistry, while approximately 19% of respondents are unsure about the potential impact of AI on dental care, and another 19% believe it will have a significant impact. This highlights the contracting perspective of the potential impact of dental AI across the industry.

EXPECTATIONS OF AI'S INFLUENCE ON WORKLOAD AND WORK QUALITY
(Graph 3, Table 5)

Over the years, technology has helped to streamline processes and enable individuals to work more effectively and efficiently. Artificial intelligence is another step in the technology journey, impacting clinicians' day-to-day work.

When asked about the impact of dental AI on the day-to-day workload of dental hygienists, respondents' thoughts were generally split. However, a relatively large portion (43.3%) indicated that AI would make the job harder in the short term but easier in the long term. This sentiment also speaks to the necessity to introduce AI technology with a comprehensive training plan to minimize the impact on daily productivity while individuals learn how to use the platform.

In terms of the work quality of dental hygienists, most respondents (68.6%) noted that AI would improve efficiency, clinical effectiveness, or both, while only 8.2% of respondents indicated a negative impact on work quality.

EXCITEMENT AND CONCERNS WITH AI IN DENTISTRY

(Tables 5-8)

The AI in Dental Hygiene Survey captured respondents' insights on what excites them most related to using dental AI technology. Despite wavering awareness and understanding of dental AI technology, responses noted an overarching positive sentiment related to the potential benefits. Respondents were asked to select up to three benefits, and six of the 10 options were rated at 30.9% or higher. Of note, about half of the respondents (49.8%) selected quantifying disease progression as their first choice, with earlier detection/finding disease that cannot be seen with the human eye receiving 43.6% of the responses, and improved ability to show areas of concern to patients being 39%.

Category	Percentage
Quantifying disease progression	49.8%
Earlier detection/Finding disease that cannot be seen with the human eye	43.6%
Improved ability to show areas of concern to patients	39.0%
Easier chart preparation	32.6%
Identifying disease progression	32.1%
Getting a "second set of eyes" to validate findings	30.9%
Streamlined insurance claims	15.9%
Summarizing patient notes	15.9%
Saving time	15.7%
None	6.2%

Note: Respondents were allowed to choose up to three responses.

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EXCITEMENT AND CONCERNS WITH AI IN DENTISTRY (cont.)

While new technology can be exciting, especially something as innovative as AI, it's important to also understand the potential concerns. Over half of the respondents chose cybersecurity and inaccuracy (both at 51.7%) as one of their concerns related to AI use in dentistry.

The survey also showed that most hygienists (80.4%) don't believe AI will replace their jobs.

Concern	Percentage
Cybersecurity	51.7%
Inaccuracy	51.7%
Decline in provider diagnostic skills	37.8%
Loss of diagnostic control/ machine-made treatment decisions	37.3%
Technology-fueled over-treatment planning	34.8%
Not enough training available	31.4%
Disparities in care from provider to provider	30.3%
Patient privacy	25.8%
Regulatory compliance	22.2%
Eroding patient trust	19.4%
Workforce/Labor displacement	16.1%
Equity and fairness	12.4%
None of the above	5.4%
Other	4.0%

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AI ADOPTION CONSIDERATIONS

(Graph 4, Tables 9-10)

Implementing AI technology is not enough; dental offices need to ensure adoption of the technology to realize the benefits. The survey asked a series of questions to gain an understanding on dental hygienists' thoughts about adoption.

Nearly 40% (38.5%) of respondents are unsure what training is available, and another 27% noted that it is hit and miss – some hygienists can access training, while others wait. This indicates a potential need for more training and potentially better access and awareness on available training.

Sentiments were across the board on whether new hygienists have the skills needed to adopt AI technology. Slightly over one-quarter (31.8%) of respondents believe new hygienists have some knowledge gaps but ramp quickly, especially when it comes to technology. Less than a quarter (22.6%) responded that new hygienists are still learning the skills needed to do the job and may not have the capacity to learn new technology, while 21.6% believe new hygienists are adequately trained and more likely to be early adopters.

Finally, the survey gathered the hygienists' perspective on whether patients would be accepting of dental AI technology. Most respondents (~67%) believe the patients' acceptance is dependent on how AI is used at the practice while 15.7% believe most of their patients will be accepting. Some dental AI technology can be used to enhance patient communications, providing clear visual examples of the patients' oral health, and bringing them along the adoption journey can also increase the ROI of this innovative technology.

38.5% OF RESPONDENTS ARE UNSURE WHAT TRAINING IS AVAILABLE

31.8% OF RESPONDENTS BELIEVE NEW HYGIENISTS HAVE SOME KNOWLEDGE GAPS BUT RAMP QUICKLY, ESPECIALLY WHEN IT COMES TO TECHNOLOGY

67% BELIEVE THE PATIENTS' ACCEPTANCE IS DEPENDENT ON HOW AI IS USED AT THE PRACTICE

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UTILIZATION AND FREQUENCY OF DENTAL AI TECHNOLOGY

(Tables 11-14)

Only 6.9% of respondents regularly use dental AI technology, and 13.9% have tried dental AI technology once. More than half of the respondents (53.3%) have had no exposure to dental AI technology, and the majority of respondents (75.3%) have never used it, meaning only 22% have been exposed and apply the technology. This data speaks to the opportunity across the dental industry and with dental hygiene professionals to engage in activities to generate greater awareness and exposure to dental AI technology.

The survey also gained insights on how those who have interacted with dental AI technology have used it.

Diagnosing dental diseases	50.8%
Educating patients	47.6%
Getting a second opinion	28.2%
Preparing charts	20.2%
Submitting supporting information for insurance claims	15.3%
Other (please specify)	13.7%
I have never interacted with dental AI technology	6.5%
Summarizing patient notes	4.0%

PRACTICES AROUND DENTAL AI TECHNOLOGY

Finally, the survey proposed questions to dental hygienists to understand if their practices use dental AI technology.

CONCLUSION

Dental hygienists who were surveyed with the AI in Dental Hygiene Survey generally do not have a strong awareness or understanding of the application and use cases for dental AI technology. Their exposure to this innovative technology has been minimal to date. This presents opportunities across the hygiene field to provide better training programs to help hygienists, dentists, and all dental office team members to understand the many ways AI can be used in dentistry.

APPENDIX

Table 1:

How familiar are you with dental artificial intelligence (AI) technology?

RESPONSE	PERCENT
Not familiar	40.8%
Somewhat familiar	36.8%
Moderately familiar	14.4%
Very familiar	6.4%
Extremely familiar	1.7%

Base = 598

Table 2:

Have you heard of the following dental AI technologies? Select all that apply.

DENTAL AI TECHNOLOGY	PERCENT
AI:Dental	26.1%
Pearl	20.4%
Overjet	19.2%
ORCA Dental AI	8.2%
Videa AI	5.4%
Other (please specify)	44.5%

Note: Respondents were allowed to select all that apply.

"Other" responses were written in and included answers such as:

None/None of the Above (233, 90.3%)

CE Class and Pearl (1, <1%)

Chat GPT (1, <1%)

Cerec (1, <1%)

Sirona (1, <1%)

Bola AI (2, <1%)

Dentrix Ascend AI (4, <1%)

Diagnocat (1, <1%)

Itero (2, <1%)

Eagle Soft (1, <1%)

Open Dental (1, <1%)

Radiology AI (1, <1%)

Retrace (1, <1%)

Simplify (1, <1%)

V7Labs (1, <1%)

Graph 1:
What areas of dental practice do you think could be most positively impacted by dental AI?
Please choose your top three.

Area	Percentage
Diagnosis	58.7%
Claim submission	41.8%
Case acceptance	40.5%
Predicting disease progression	40.5%
Chart preparation/Team huddles	32.1%
Time savings	27.3%
Patient scheduling	24.6%
I don't know of any positives…	14.0%
Attracting new patients	13.2%
Other	7.4%
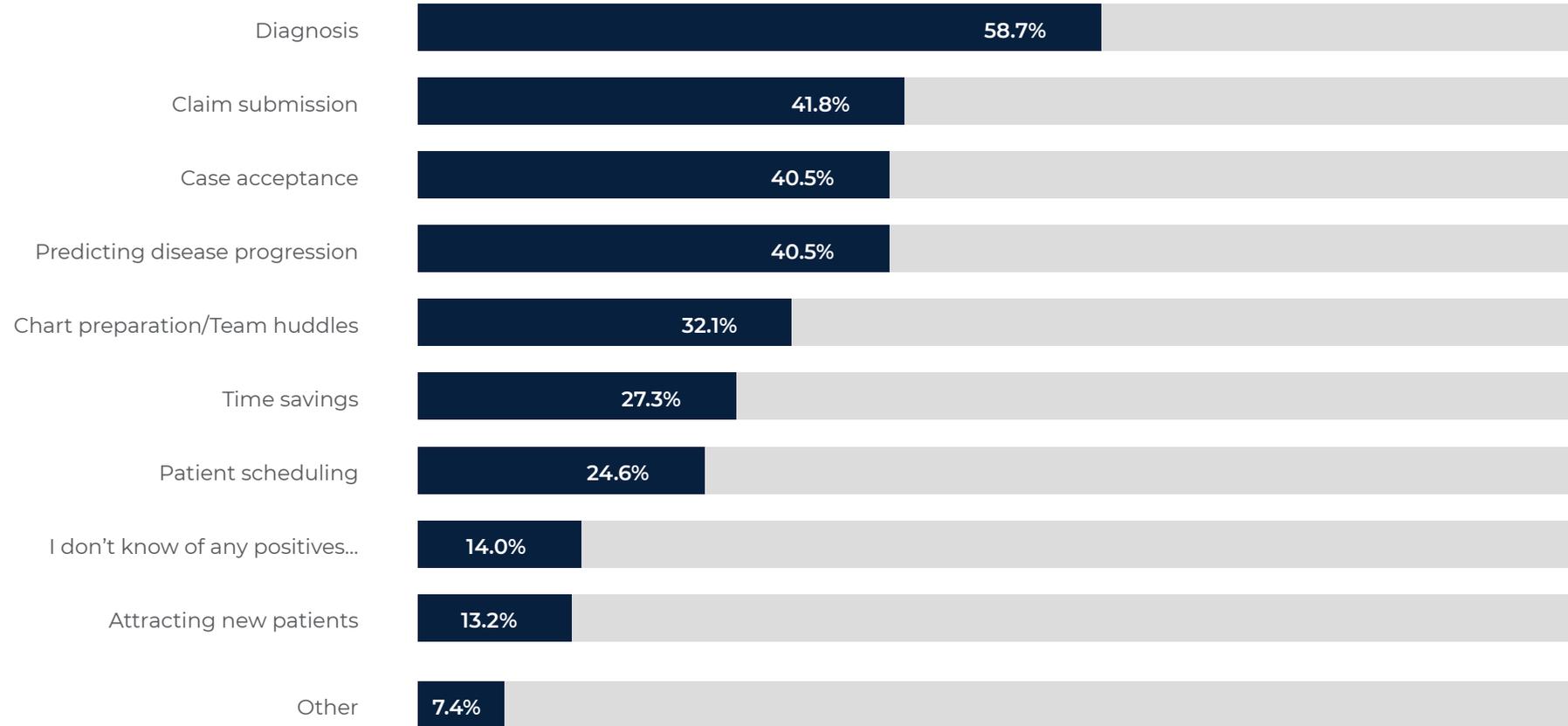
Note: Respondents were asked to select up to three responses.

Other responses include (44 responses):

Unsure/Don't know (14, 31.8%)

None (8, 19%)

Assessments (1, <1%)

Chart notes (1, <1%)

Data gathering (1, <1%)

Interprofessional collaboration (1, <1%)

OHI (1, <1%)

Patient education (3, <1%)

Perio charting (2, <1%)

Providing care to underserved areas (1, <1%)

Social media (1, <1%)

Assisting/Double-checking work (2, <1%)

Miscellaneous (8, 19%)

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Graph 2:

How interested is your dental practice in adopting AI technology?

- Not at all interested
- Somewhat interested
- Moderately interested
- Very interested
- Extremely interested
- Our practice is already using dental AI technology
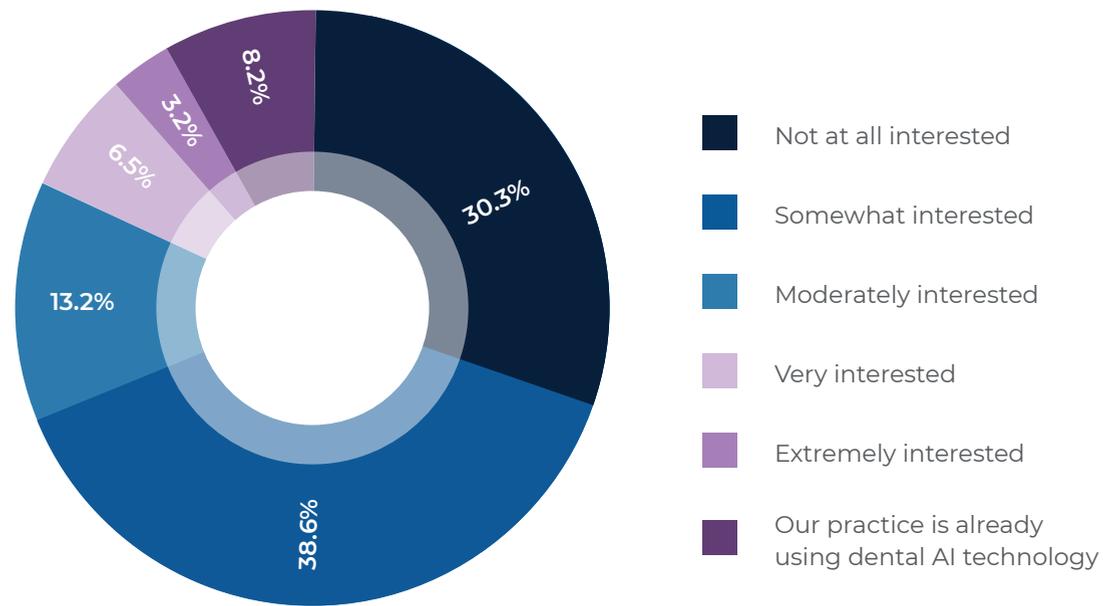
Base = 598

Table 3:

How prepared is your dental practice to adopt AI technology?

RESPONSE	PERCENT
Not at all prepared	50.2%
Somewhat prepared	29.1%
Moderately prepared	10.7%
Very prepared	6.2%
Extremely prepared	3.8%

Base = 598

Table 4:

Do you believe AI will significantly benefit dental care in the next 1-3 years?

RESPONSE	PERCENT
No impact. AI won't bring anything positive to dentistry in the next 1-3 years.	3.0%
Little impact. AI will do some good in the next 1-3 years, but it's mostly hype.	21.4%
Moderate impact. AI will bring several practical benefits to dentistry in the next 1-3 years.	38.3%
Significant impact. AI will change the game in the next 1-3 years.	18.6%
Unsure, I'll wait and see.	18.7%

Base = 598

Graph 3:

How do you think AI will change the day-to-day workload of dental hygienists?

Response	Percent
Make the job easier	22.6%
Make the job harder	7.9%
Harder in the short term, easier in the long term	43.3%
Easier in the short term, harder in the long term	3.5%
No change to day-to-day job	22.7%
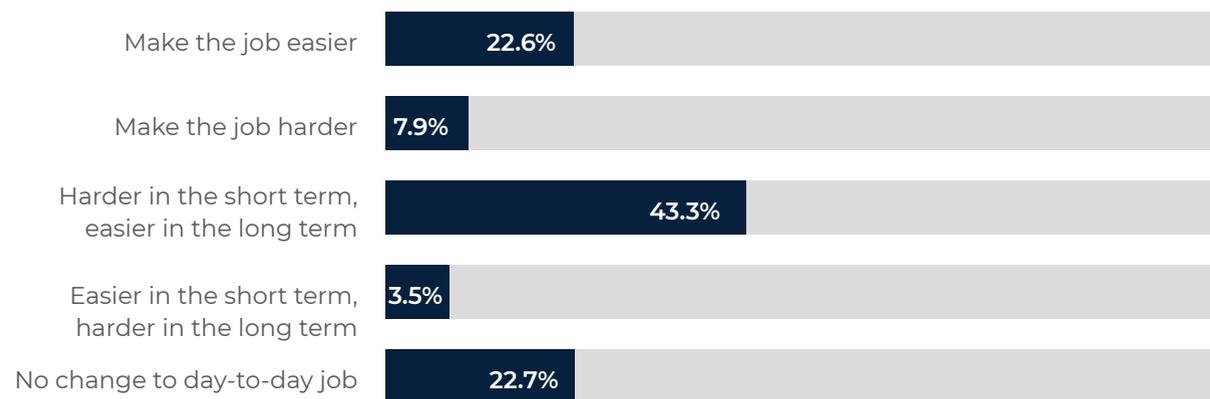
Base = 598

Table 5:

How do you think AI will change the work quality of dental hygienists?

RESPONSE	PERCENT
Improve efficiency	21.1%
Improve clinical effectiveness	11.5%
Improve both efficiency and clinical effectiveness	36.0%
No impact whatsoever on work quality	23.2%
Negative impact on work quality	8.2%

Base = 598

Table 6:

Are you worried AI will replace dental hygienists?

RESPONSE	PERCENT
No, AI won't replace hygienists, just help them do their job better.	80.4%
Yes, I worry dental practices will try to do more with fewer people.	9.7%
Unsure	9.9%

Base = 598

Table 7:

Choose up to three (3) things that excite you most about how you could use dental AI technology as a hygienist.

RESPONSE	PERCENT
Quantifying disease progression	49.8%
Earlier detection/Finding disease that cannot be seen with the human eye	43.6%
Improved ability to show areas of concern to patients	39.0%
Easier chart preparation	32.6%
Identifying disease progression	32.1%
Getting a "second set of eyes" to validate findings	30.9%
Streamlined insurance claims	15.9%
Summarizing patient notes	15.9%
Saving time	15.7%
None	6.2%

Note: Respondents were allowed to choose up to three responses.

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Table 8:
Do you have concerns related to the use of AI in dentistry?
Select all that apply.

RESPONSE	PERCENT
Cybersecurity	**51.7%**
Inaccuracy	**51.7%**
Decline in provider diagnostic skills	37.8%
Loss of diagnostic control/machine-made treatment decisions	37.3%
Technology-fueled over-treatment planning	34.8%
Not enough training available	31.4%
Disparities in care from provider to provider	30.3%
Patient privacy	25.8%
Regulatory compliance	22.2%
Eroding patient trust	19.4%
Workforce/Labor displacement	16.1%
Equity and fairness	12.4%
None of the above	5.4%
Other	4.0%

Graph 4:
Do you think experienced hygienists have access to adequate training to adopt AI in dentistry?

Yes, there are lots of CE courses available for practicing hygienists. — 7.4%

No, there are not enough courses available to meet demand. — 27.1%

Hit and miss; some hygienists can access training, while others wait. — 27.1%

Unsure what training is available. — 38.5%
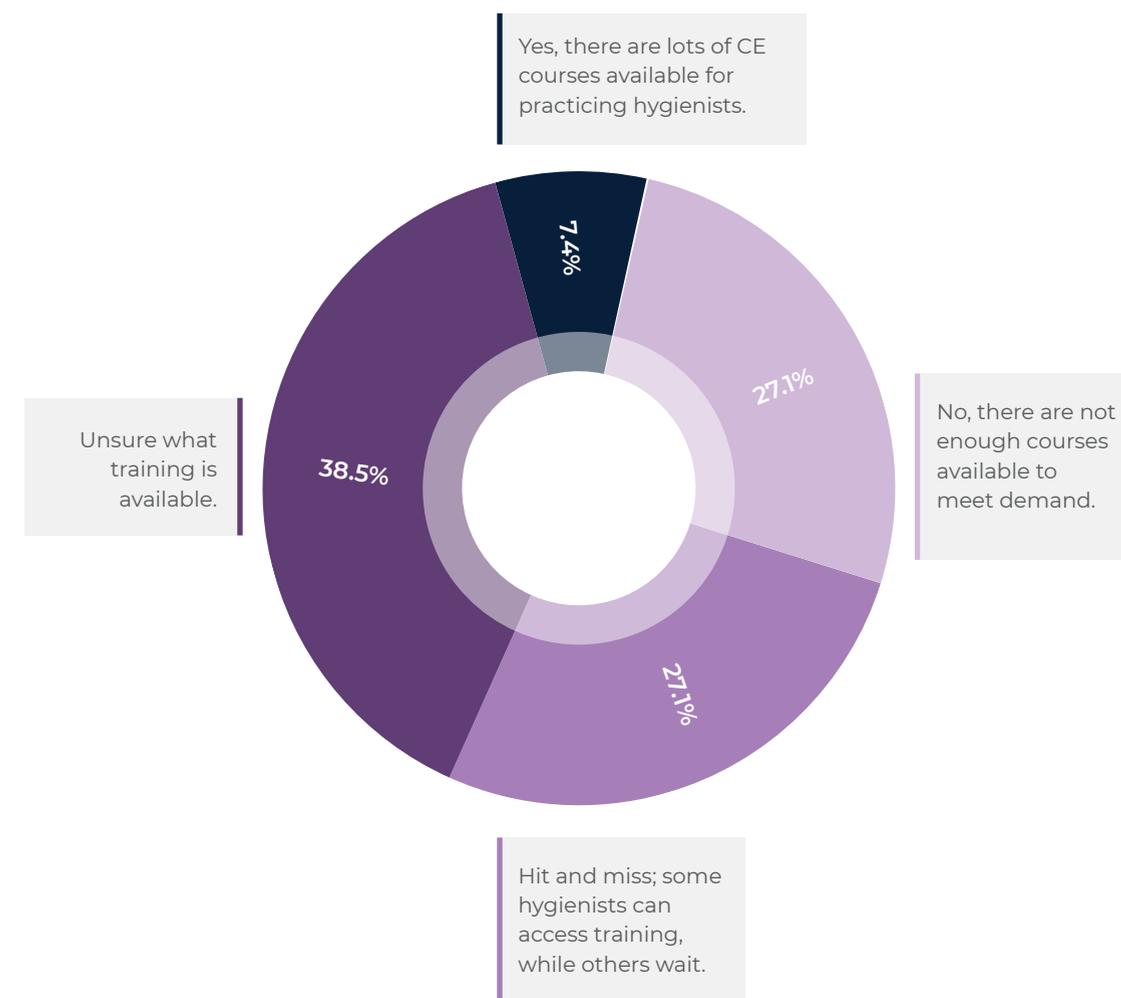
Table 9:

Do you think new hygienists have the skills needed to adopt AI technology? Choose the answer that most closely aligns with your beliefs.

RESPONSE	PERCENT
New hygienists have some knowledge gaps but ramp quickly, especially when it comes to technology.	31.8%
Unsure/Don't work with new hygienists	24.1%
New hygienists are still learning the skills they need to do the job and may not have capacity to learn new technology.	22.6%
Yes, new hygienists are adequately trained and more likely to be early adopters.	21.6%

Base = 598

Table 10:

Do you think patients will be accepting of AI technology in dental care?

RESPONSE	PERCENT
Yes, I think most of my patients will be accepting of AI.	15.7%
No, I think AI will make most of my patients nervous.	8.4%
Maybe. I think it depends on how AI is used at the practice.	66.6%
I don't know if my patients will accept AI technology or not.	9.4%

Base = 598

Table 11:

Have you ever used any dental AI technologies?

RESPONSE	PERCENT
I have had no exposure to dental AI technologies.	53.3%
I am aware of dental AI technologies but have not interacted with any.	25.9%
I have tried at least one dental AI technology.	13.9%
I regularly use dental AI technologies.	6.9%

Base = 598

Table 12:

If you have interacted with dental AI technologies, how have you used them? Select all that apply.

RESPONSE	PERCENT
Diagnosing dental diseases	**50.8%**
Educating patients	**47.6%**
Getting a second opinion	28.2%
Preparing charts	20.2%
Submitting supporting information for insurance claims	15.3%
Other (please specify)	13.7%
I have never interacted with dental AI technology	6.5%
Summarizing patient notes	4.0%

Base = 598

Other uses were written in and include (17 responses):

Case-based practice for students (1, 6%)

Creating a wellness scan opposite X-ray visit (1, 6%)

Grammarly (1, 6%)

I look at it, but don't use it. Makes it harder to close out my X-rays (1, 6%)

Itero scan comparisons and Invisalign (1, 6%)

Just saw it used when temping (1, 6%)

Just starting to use a CBT with AI (1, 6%)

None, our doctors are supposed to use them but do not (1, 6%)

Perio charting (4, 23.5%)

Personal use (1, 6%)

Practice analytics (1, 6%)

Tracking patient progress (1, 6%)

In the classroom (2, 12%)

Table 13:

When did you last use dental AI technologies?

RESPONSE	PERCENT
Within the past 6 moths	18.6%
7 months to 1 year ago	2.0%
1 to 2 years ago	2.5%
More than 2 years ago	1.7%
I have never used dental AI technologies	75.3%

Base = 598

Table 14:

How frequently do you use dental AI technologies?

RESPONSE	PERCENT
Every day	8.9%
2 to 3 times per week	3.2%
Once a week	1.3%
1 to 3 times per month	1.7%
I do not frequently use dental AI technologies	84.9%

Base = 598

DEMOGRAPHIC DATA

YEARS OF EXPERIENCE

Most respondents have been a dental hygienist for over 20 years (55.9%).

Current hygiene student	Less than 1 year	1-3 years	4-10 years	11-20 years	20+ years
1.7%	4.2%	3.5%	14.1%	20.6%	55.9%

Base = 598

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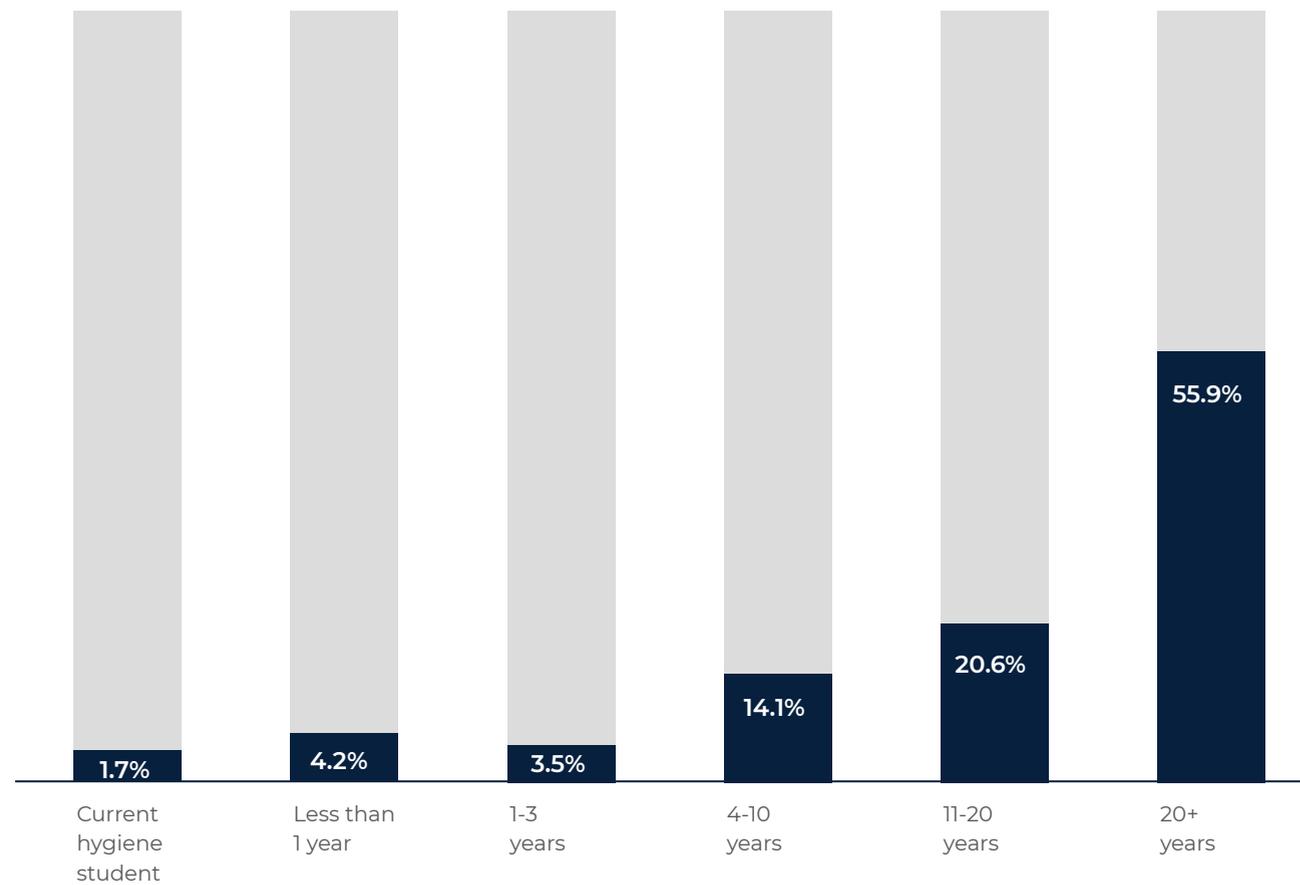
PRACTICE SETTINGS

Almost half (45.5%) of respondents practice in a private dental practice.

RESPONSE	PERCENT
Private dental practice (one office)	45.5%
Educational institution faculty or administrator	18.1%
Public health	9.4%
Small group practice (2-9 offices)	8.4%
DSO-supported dental practice	7.0%
Other	6.7%
Temp agency	1.8%
Mid to large group practice (10+ offices)	1.7%
Student	1.5%

Base = 598

Other answers were written in (40 responses) and included retired (seven responses), independent practitioner (two responses), volunteer work (two responses), and some combination of all of the above.

EDUCATION LEVEL

Most respondents have a bachelor's degree or higher (68.7%).

| RESPONSE	PERCENT
High school diploma	0.7%
Associate degree	25.8%
Bachelor's degree	42.7%
Master's degree	26.0%
Other	4.9%

Base = 598

Other responses were written in and include Ph.D. or doctorate (29 responses).

AGE DISTRIBUTION

Most respondents are 35 or older (88.2%).
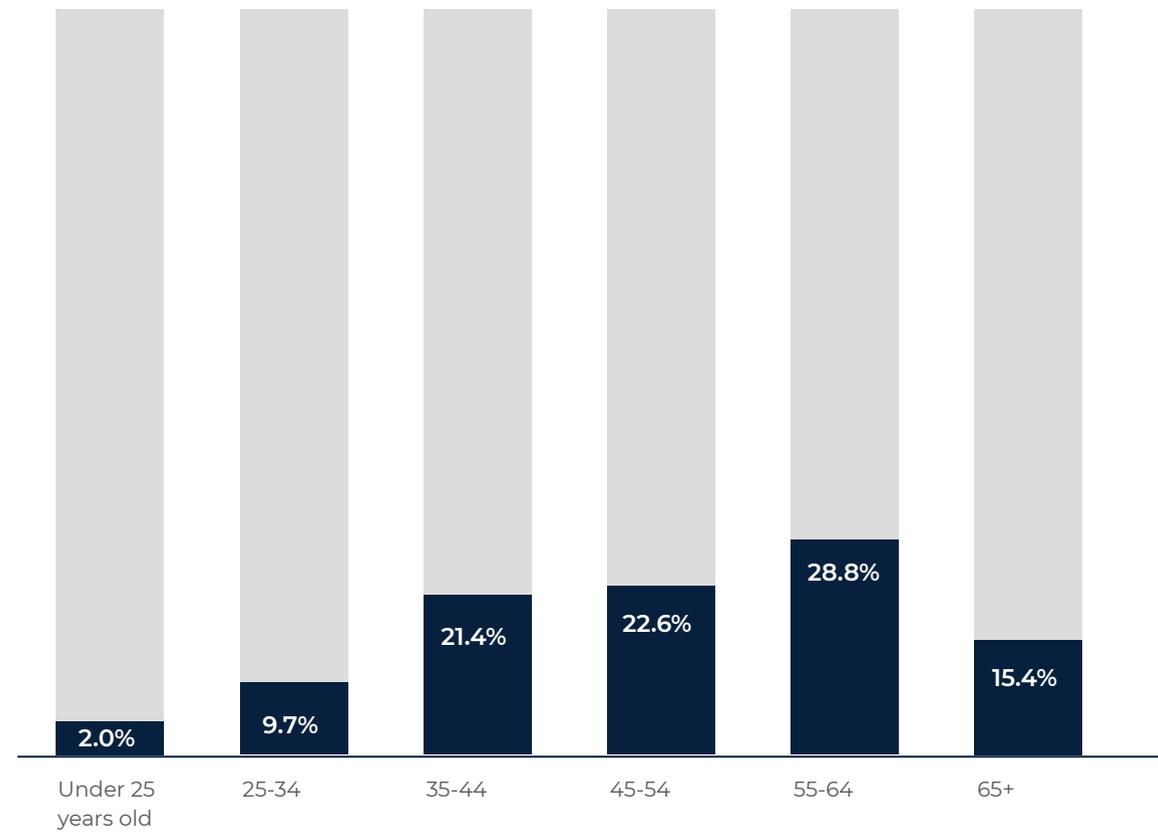
GEOGRAPHIC DISTRIBUTION

Individuals responded from all 50 United States. The most frequently selected states of residence were Texas (8.8%), Colorado (5.2%), and Washington (5.2%). The least frequently selected states were Oklahoma (0.3%), North Dakota (0.2%), and Rhode Island (0.2%).

RACE & ETHNICITY

An overwhelming majority of respondents identified as white or Caucasian (82.2%).

RESPONSE	PERCENT
White/Caucasian	82.2%
Hispanic	7.6%
Asian or Asian American	3.6%
Multiple races, ethnicities/Other	3.1%
Black or African American	2.4%
American Indian or Alaskan Native	0.8%
Middle Eastern or North African	0.3%

Age distribution bar chart:

- Under 25 years old: 2.0%
- 25-34: 9.7%
- 35-44: 21.4%
- 45-54: 22.6%
- 55-64: 28.8%
- 65+: 15.4%

Base = 598

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