Received: 21 June 2020 | Revised: 26 April 2021 | Accepted: 6 June 2021

DOI: 10.1002/jdd.12704

ADEA THE VOICE OF DENTAL EDUCATION WILEY

ORIGINAL ARTICLE

The status of climate studies in the United States and Canadian dental schools: Deans' perspectives

Todd V. Ester DDS, MA[1] | **Felicia L. Tucker-Lively PhD, MPH**[2] | **Carlos Smith DDS, MDiv**[3] | **George W. Taylor DMD, MPH, DrPH**[4] | **Tawana K. Ware DDS, MSD**[5] | **Marita R. Inglehart Dipl Psych, Dr phil, Dr phil habil**[6]

[1] School of DentistryUniversity of Michigan, Ann Arbor, Michigan, USA

[2] Academy for Advancing Leadership (AAL), Atlanta, Georgia, USA

[3] Virginia Commonwealth University School of Dentistry, Richmond, Virginia, USA

[4] University of California San Francisco School of Dentistry, San Francisco, California, USA

[5] Department of Pediatric Dentistry, Indiana University School of Dentistry, Indianapolis, Indiana, USA

[6] Department of Periodontics and Oral Medicine, School of Dentistry, University of Michigan, Ann Arbor, Michigan, USA

Correspondence
Marita R. Inglehart, Department of Periodontics and Oral Medicine, School of Dentistry, University of Michigan, 1011 N. University St, Ann Arbor, MI, USA.
Email: mri@umich.edu

Abstract

Objectives: Institutions with a positive cultural climate make community members from all backgrounds valued and included, and treated equitably. Such an environment is optimally suited to prepare future dentists well for leading a diverse team of staff members and addressing the oral health care needs of increasingly more diverse patient populations. The objectives were to assess how many United States and Canadian dental schools had participated in a climate study at their parent institution and/or had conducted their own climate study, which topics these studies had addressed, how they collected their data, from whom they collected data, and how the findings affected these academic units.

Methods: In January 2020, 54 of the 78 dental school deans in the United States and Canada responded to a web-based survey (response rate: 69%).

Results: Forty-six parent institutions (85%) and 27 dental schools (50%) had conducted climate studies. Eighty-seven percent of parent institutions assessed the climate overall and the climate for specific groups (70%), such as for persons from underrepresented minority backgrounds (67%) or different religious backgrounds (59%). Most parent institution and dental school studies utilized surveys to collect data from faculty (parent institutions: 76%/dental schools: 96%), staff (74%/93%), administrators (72%/93%), and students (72%/89%). Overall, climate study results positively affected parent institutions' and dental schools' humanistic environment (61%/63%) and the recruitment of faculty (46%/50%), students (46%/46%), and staff (41%/43%).

Conclusions: Climate studies are a widely accepted practice at dental schools and their parent institutions. Their results can play a vital role in shaping the climate of these academic units by fostering efforts to increase diversity, equity, and inclusion.

KEYWORDS
academic climate study, campus climate study, cultural climate study, culture, dental, diversity, education, equity, inclusion, schools

1 | INTRODUCTION

Based on United States (U.S.) census data, it was projected that the U.S. is becoming minority White by 2045.[1] Educating future dentists to be optimally qualified to lead diverse dental teams and to address the oral health care needs of increasingly more diverse patient populations is therefore crucial. The Commission on Dental Accreditation (CODA) addresses this fact in their Accreditation Standards for Dental Education Programs.[2] For example, Standard 2-17 states "graduates must be competent in managing a diverse patient population and have the interpersonal and communication skills to function successfully in a multicultural work environment." CODA defined this required cultural competency on page 17 as having "the ability to provide care to patients with diverse backgrounds, values, beliefs, and behaviors, including tailoring care delivery to meet patients' social, cultural, and linguistic needs." While CODA does not require dental schools to conduct climate studies, it does expect to see empirical evidence that demonstrates that the schools comply with the accreditation standards. Standard 1-3 offers focus groups and/or surveys directed toward gathering information on student, faculty, patient, and alumni perceptions of the cultural environment as examples of empirical evidence that demonstrates compliance with the Standard. In addition, CODA Standard 1-4 specifically delineates "the dental school must have policies and practices to systematically evaluate comprehensive strategies to improve the institutional climate for diversity." Climate studies serve as an ideal mechanism that allows dental schools to document their compliance with these accreditation standards.[2]

In addition, having a positive cultural climate contributes to creating an environment that makes community members from all and especially diverse backgrounds feel valued and included, and treated equitably. Such an environment is optimally suited to prepare future dentists well for leading a diverse team of staff members and addressing the oral health care needs of increasingly more diverse patient populations.

One so far unanswered question is how many dental schools in the United States and Canada participated in a climate study at their parent institution and/or conducted their own climate study. A rich research base of previous academic climate studies offered information about how these studies can be structured. In 1990, Peterson and Spencer provided an excellent overview of how climate studies collected data about the climate of single academic institutions since the 1960s.[3] More recently in 2008, Hart and Fellabaum published a comparative analysis of 118 campus climate studies that were conducted between 1991 and 2004.[4] They found that while campus climate terminology was referenced frequently, the assessments varied greatly in their definitions, designs, instrumentation, and experiences explored.

Research in dental education also provides insights into the value of climate studies and how they can be conducted. In 1997, the University of Michigan – School of Dentistry published a first report about a climate study that had been planned and executed between February 1994 and September 1995.[5] These authors used the term "cultural audit" because they collected eight different types of data to "audit" all aspects of the school's climate to gain a comprehensive understanding. For this purpose, dental students, staff, faculty members, and patients responded to surveys; community members who self-identified as lesbian, gay, or bisexual participated in focus groups.[6] A curriculum analysis assessed the coverage of diversity-related content and an overview of available library resources helped to identify material that could support educational efforts. A statistical records analysis analyzed the diversity of students, staff, and faculty and the recruitment and retention of male and female dental school community members from different racial/ethnic backgrounds. Direct observations of patients using wheelchairs helped to understand (dis)ability-related issues such as accessibility of the building. Experts involved in handling diversity-related grievances and conflicts participated in interviews to learn more about handling these matters.

This first comprehensive cultural audit in a US dental school resulted in wide-ranging changes. The school adopted a revised mission statement. It changed the name of the Minority Affairs Office (1971–1996) to the "Office of Multicultural Affairs" (1997–2014). The school has conducted diversity-related orientation sessions for incoming dental and dental hygiene students since then. A Multicultural Affairs Committee (MAC) consisting of students, staff, faculty members, and alumni was formed. This committee has organized free monthly continuing education courses about treating patients with special health care needs/disabilities and community building events. The MAC has published a diversity-related newsletter ("Multicultural Mirror") two to three times a year since then. In 2006 and 2015,[7] the surveys with faculty, staff, and students that had been developed in 1997 were used for follow-up cultural climate surveys. This process provided opportunities for analyzing changes over time.

While the term "cultural audit" was used in this first study at a US dental school, a more commonly used term in the literature is "campus climate study" or just "climate study." Hart and Fellabaum explained that the term campus climate can refer to "quality of life" issues on a campus and/or to the diversity-related campus climate.[4] This definition is helpful because it clarified the content addressed in such studies that differs from the content addressed in organizational climate studies. Schneider et al. defined

organizational climate in their review article as "the shared perceptions of and the meaning attached to the policies, practices, and procedures employees experience and the behaviors they observe getting rewarded and that are supported and expected."[8] Robinson and Reddy published an excellent example of an organizational climate study in a dental school in 2016,[9] while McCann and colleagues provided information about their cultural climate study at the Texas A & M College of Dentistry in 2017.[10]

Despite these school-specific climate studies, no research so far explored the academic climate in dental schools in the United States and Canada comparatively. However, there is clear evidence that dental institutions in the United States and Canada have recognized the importance of cultural diversity as essential to the development of culturally competent future dentists. Programs have been used widely for increasing the recruitment and retention of middle school students from underrepresented minority (URM) backgrounds,[11,12] high school students from URM and/or socioeconomically disadvantaged backgrounds,[13] and college students from disadvantaged backgrounds.[14,15] In addition, the integration of community-based and other educational experiences showed how to provide dental students with culturally diverse educational experiences.[16–19] Despite all these efforts, only one study took a comparative approach by exploring the cultural climate at six southwest dental schools and dental hygiene programs.[20]

While no other comparative research in dental schools has taken place, other health professions have conducted nationwide climate studies. For example, in 2011, the Association of American Veterinary Medical Colleges (AVMC) conducted a survey-based climate study of students and faculty at all veterinary medical colleges in the United States.[21] When this survey showed specific challenges for certain subpopulations such as persons from LGBTQ+ backgrounds, this organization followed up with a more focused survey and focus groups.[22]

In addition, the American Association of Colleges of Nursing (AACN) conducted a Diversity and Inclusion Member Needs Survey in 2018. This organization collected data from over 100 nursing schools.[23] While the Association of American Medical Colleges (AAMC) did not conduct a nationwide climate study, they supported efforts to develop an instrument that focuses on measuring diversity and inclusion in academic medicine and administered it in 14 medical schools.[24]

In consideration of the relatively small number of publications about climate studies in US and Canadian dental schools, the objectives of this study were to assess (a) how many US and Canadian dental schools had participated in a climate study at their parent institution and/or had conducted their own climate study; (b) who conducted these studies; (c) which topics were addressed; (d) which data collection methods were used; (e) from whom data were collected; and (f) how the findings affected these academic units. In short, this research is a fact-finding mission that analyzes past efforts. Future research can then explore which efforts dental school deans would like to see in the future.

2 | METHODS

This research was determined to be exempt from Institutional Review Board (IRB) oversight by the Health Sciences and Behavioral Sciences IRB at the University of Michigan, Ann Arbor, MI (#HUM00171488). This cross-sectional study used web-based survey methodology to collect data from dental school deans or their designees in the United States and Canada.

2.1 | Respondents

Forty-five of the 68 dental schools in the US (response rate: 66%) and seven of the 10 dental schools in Canada (response rate: 70%) responded to this survey. In addition, two dental schools submitted their responses anonymously, which resulted in 54 responding schools (response rate: 69%).

2.2 | Procedures

The deans of the 78 dental schools in the US and Canada received a first recruitment email on January 6, 2020. The email explained the purpose of the research, provided a link to an anonymous web-based Qualtrics survey, and asked for survey completion by January 14, 2020. Only 28 schools responded by this deadline. While the survey was anonymous, we asked the deans to volunteer information about which school they represented. Most deans provided their school's name and so it was possible to send follow-up recruitment emails only to the nonresponding deans on January 16, 2020. This email resulted in an additional 19 responses by January 21, 2020. On this date, the investigators mailed a second and final follow-up email to the nonrespondent deans. This final email gained an additional seven responses by January 30, 2020.

In addition to these recruitment emails by the research team, Dr. Karen West, the CEO and President of the American Dental Education Association (ADEA) sent an email to all deans, expressing her support for these efforts 2 days after the first recruitment email. An email to the diversity officers of the dental schools informed these

administrators about this survey and encouraged them to communicate the importance of these efforts to their deans.

2.3 | Materials

The first recruitment email and the two follow-up emails were formulated according to the guidelines provided by the Health Sciences and Behavioral Sciences IRB at the University of Michigan. The survey was developed in three iterations. After drafting a first survey, two administrators and one faculty member who had participated in previous climate studies critically reviewed the questions. Based on this feedback, a revised version was created that was pilot tested with six faculty/administrators. The final revised version was then used for collecting the data from dental school deans in the US and Canada.

This version consisted of five parts. Part 1 asked the respondents to volunteer the name of their school, information about who responded to the survey and whether their parent institution previously conducted a climate study. Those respondents whose parent institutions had not conducted a climate study continued to Part 2 and answered questions concerning the reasons for not having had a university-wide climate study. Respondents whose parent institutions had conducted a study moved to Part 3 and answered questions about this climate study. At the end of Parts 2 and 3, the respondents answered the question whether their own school had conducted a climate study. Respondents whose schools had not conducted a climate study continued with Part 4 and answered questions about the reasons for not having had a climate study. Respondents whose schools had conducted their own climate study responded to questions in Part 5 about how that study had been conducted. At the end of Parts 4 and 5, the respondents answered a question about the likelihood of their school's participation in a joint ADEA-led climate study of all dental schools in the United States and Canada. While most questions were closed-ended questions, open-ended follow-up questions allowed the respondents to provide additional information, if desired.

2.4 | Statistical analysis

The data were downloaded from the Qualtrics website as an SPSS data file (Version 26). Descriptive statistics such as frequencies, percentages, means, and standard deviations were computed to provide an overview of the responses. The means of the schools that had versus had not conducted their own dental school climate study were compared with an independent sample *t*-test. A value of $p < 0.05$ was accepted as significant.

3 | RESULTS

Table 1 provides an overview of the frequencies of responses and the frequencies with which climate studies had been conducted either at the respondents' parent institution or at their dental school. Forty-five of the 68 dental schools in the United States (response rate: 66%) and seven of the 10 dental schools in Canada (response rate: 70%) responded. In addition, two schools responded without providing their name, which resulted in 54 total responses (response rate: 69%).

The parent institutions of 42 of the 45 US dental schools (93%) and of three of the seven responding Canadian dental schools (43%) plus one anonymous school previously conducted climate studies. In addition, 25 of the 45 dental schools in the United States (56%) and one of the seven Canadian dental schools (14%) plus one of the two anonymous schools previously had conducted a climate study in their own dental school.

In response to the question, who had been involved in conducting the climate studies in their schools, the majority responded that their dental school administrators (70%), staff (67%), and faculty (56%) had been involved, with fewer schools having engaged outside consultants (26%) or had support from their parent institution (19%). While the earliest climate study in a dental school took place in 1994/1995, nearly all other schools conducted their climate studies during the past decade.

Table 2 shows that only one respondent whose parent institution had not previously conducted a climate study knew about plans to conduct such a project in the future, while eight respondents from dental schools without previous climate studies (32%) reported that their dental schools had plans for a future climate study. In addition, seven dental schools remarked that their school had not conducted a climate study because their academic unit had been included in their parent institutions' climate study. One school mentioned that climate questions were part of other surveys they had administered.

Information about which topics were covered in the parent institutions' climate studies showed that 87% assessed the climate overall and 70% the climate for specific groups of dental school community members (Table 3). Specifically, 67% inquired about the climate for persons from underrepresented minority (URM) backgrounds, 63% about the climate for women, 59% about the climate for persons from different religious backgrounds, 54% for persons with different sexual orientations, and 50% for persons with special health care

TABLE 1 Number and percentages of responses and previously conducted climate studies

Responses	Frequencies	Percentages
Response rate by country:		
- United States	45 of 68	66
- Canada	7 of 10	70
- Anonymous responses	2 of 78	3
- Total	54 of 78	69
Climate studies were conducted:	Yes	Yes
in the academic institution		
- United States	42 of 45	93
- Canada	3 of 7	43
- Anonymous submission	1 of 2	50
- All respondents	46 of 54	85
in own dental school		
- United States	25 of 45	56
- Canada	1 of 7	14
- Anonymous submission	1 of 2	50
- All respondents	27 of 54	50%
Persons/groups involved in conducting the 27 dental school climate studies:	**N/A**	*N* (%)
- Dental school administrators		19 (70)
- Dental school staff		18 (67)
- Dental school faculty		15 (56)
- Dental school students		11 (41)
- Consultants from outside the university		7 (26)
- Members of our university		5 (19)
- Dental school patients		2 (7)
- Members of the community		1 (4)

TABLE 2 Answers of respondents whose parent institution and/or dental school had not conducted a climate study

	No previous climate study was conducted by respondents	
Responses from schools with no previous parent institution or dental school climate study	**In 8 parent institutions: Yes**	**In 25 dental schools: Yes**
Are there plans to conduct a climate study in the future?	1	8
A climate study was not conducted because of:	Yes	Yes
Not aware of the reason	5	5
Limited personnel to conduct the climate study	0	1
Prohibitive cost	0	0
Too time consuming	0	0
Would not be of value	0	0
Other:	0	
- Dental school survey is part of university-wide study	-	7
- Climate questions are integrated into other surveys	-	1

needs/disabilities. When asked which questions about other groups were included in their studies, two schools volunteered that their climate study had asked questions about the climate for immigrants, one school each had covered questions concerning persons from different socioeconomic backgrounds, persons from urban versus rural settings, and persons with HIV or other communicable diseases.

Table 4 shows how frequently parent institutions and dental schools used different methods to collect data from different groups of persons. The most frequently used methods in both types of climate studies were surveys.

TABLE 3 Responses related to topics covered in the parent institutions' climate studies

Climate studies conducted by the parent institutions covered the climate	Frequencies $N = 46$	Percentages
- Overall	40	87
- For specific groups of community members	32	70
- For persons from underrepresented minority backgrounds	31	67
- For women	29	63
- For persons from different religious backgrounds	27	59
- For persons with different sexual orientations	25	54
- For persons with special health care needs/disabilities	23	50
- For persons with different trans/nonbinary gender identities	21	46
- For persons with other characteristics	7	15
Five open-ended answers:		
- Immigrants	2	4
- Socioeconomic background	1	2
- Urban/rural	1	2
- HIV/communicable diseases	1	2

TABLE 4 Responses related to types of data collected from different groups in parent institution and in dental school climate studies

In 46 parent climate studies, data were collected from	Methods used in climate studies in 46 parent institutions				
	Surveys	Interviews	Focus groups	Observations	Other
Administrators	72%	13%	11%	2%	0%
Faculty	76%	11%	17%	2%	0%
Patients	30%	7%	2%	2%	2%
Staff	74%	7%	15%	7%	0%
Students	72%	7%	20%	7%	2%
Post-graduate residents	67%	4%	2%	4%	0%
Fellows	48%	2%	7%	4%	0%
Others	2%	0%	0%	2%	2%
In 27 dental school climate studies, data were collected from	**Methods used in climate studies in 27 dental schools**				
	Surveys	Interviews	Focus groups	Observations	Other
Administrators	93%	11%	11%	4%	0%
Faculty	96%	7%	26%	7%	0%
Patients	41%	4%	15%	7%	0%
Staff	93%	7%	26%	4%	0%
Students	89%	2%	33%	7%	0%
Post-graduate residents	74%	4%	11%	0%	0%
Fellows	48%	4%	4%	0%	0%
Alumni	37%	0%	11%	0%	0%

Seventy-six percent of academic institutions surveyed faculty, 74% surveyed staff, 72% students and administrators, and 67% post-graduate residents. Focus groups with students (20%), faculty (17%), staff (15%), and administrators (11%) took place as well. However, very few institutions used interviews or observational studies.

Dental school climate studies also used survey methodology most frequently, with 96% schools surveying faculty, 93% administrators or staff members, 89% students, and 74% post-graduate residents. Only 11 schools surveyed patients and 10 schools surveyed alumni. Very few dental schools used interviews or observations to collect data. However, several schools used focus groups. For example, nine parent institutions and dental schools conducted focus groups with students, seven with staff members, and five parent institutions, and three dental

TABLE 5 Responses related to questions about how parent institution and dental school climate studies affected respondents' parent institution and dental schools

Different aspects affected by findings of climate studies	Parent institution's climate studies affected		Dental school study affected
	Parent institutions	Dental school communities	Dental school communities
- Mission	33%	26%	33%
- Funding for university's office of diversity/equity/inclusion	41%	24%	33%
- Curriculum	46%	41%	66%
- Recruitment efforts of students from diverse backgrounds	46%	46%	56%
- Recruitment efforts of staff from diverse backgrounds	41%	43%	44%
- Recruitment efforts of faculty from diverse backgrounds	46%	50%	56%
- Humanistic environment	61%	63%	81%
- Other aspects	7%	13%	22%
	Parent institution's climate studies affected		**Dental school study affected**
Overall impact	**Parent institution overall**	**Dental school overall**	**Dental school overall**
Impact:	$N = 37$	$N = 38$	$N = 25$
1 = not at all	0%	2%	0%
2 = a little	15%	33%	19%
3 = moderate amount	39%	28%	37%
4 = a lot	22%	11%	15%
5 = a great deal	24%	9%	22%
Mean (SD)	3.13 (0.811)	2.88 (1.034)	3.44 (1.083)
		$p = 0.104$[a]	

[a]An independent sample *t*-test was used to test whether the two means differed significantly.

schools, respectively, included administrators in focus groups.

Table 5 addresses the questions of how the results of the climate studies of the parent institutions affected the parent institutions and the dental schools and how the findings of the dental school studies affected the dental schools. The majority of schools agreed that institutional findings positively affected the humanistic environment in their institution (61%) and dental school (63%); nearly half reported that these findings positively affected the recruitment efforts of faculty from diverse backgrounds (46%/50%), students (46%/46%), and staff (41%/43%), as well as curricula (46%/41%). The effects of the dental school climate studies were even more positive, with 81% of the schools reporting that their climate study results had positively affected their humanistic environment, 66% their curriculum, and 56% the recruitment of students and faculty. About one third of the schools reported that the findings positively affected their school's mission.

When asked how much impact the parent institution's climate study had overall, the average answer for the impact on the parent institution was moderate (5-point answer scale with 1 = not at all to 5 = a great deal of impact; mean = 3.13). The mean impact of the parent institution's climate study on the dental school (mean = 2.88) did not differ from the mean impact on the institution. However, the 25 dental schools who rated the overall impact of the dental school climate study on their dental school evaluated this impact slightly higher (mean = 3.44). In addition, a comparison of the responses of the 22 dental schools who had rated both the impact of the parent institution and the dental school climate studies on their schools showed that they evaluated the impact of their dental school's study as higher than the impact of the parent institution study (means: 3.59 vs. 2.91; $p = 0.003$).

A final survey question asked how likely it would be that the dental schools would participate in an ADEA-led joint climate study of all US and Canadian dental schools. Fifteen of the 54 respondents (28%) indicated that they would be very likely to participate, 24% would be likely to participate, 22% would be moderately likely, and 9% a little likely. No dean answered that their school would be not at all likely to participate in an ADEA-led joint climate study. A comparison of the average responses to this question of dental schools with versus without their own

climate study showed that schools with previous climate study experiences were more likely to indicate they would participate than schools without such experiences (5-point answer scale with 1 = not at all to 5 = very likely: 4.12 vs. 3.50; $p = 0.042$).

4 | DISCUSSION

This study was the first comparative analysis of how many parent institutions of dental schools and/or dental schools in the United States and Canada had conducted climate studies, how they had conducted these studies, which topics were studied, how and from whom data were collected, and which changes were initiated based on these data. Collecting data to answer these questions needed respondents with a high level of administrative expertise. The decision was therefore made to ask dental school deans about climate studies in their parent institution and in their own school. The fact that 54 of the 78 deans responded to the survey is an exceptionally high response rate.[25] It could be interpreted as a sign that they considered the topic of this survey a priority. In any case, their responses provide a solid database for answering the questions of interest in this study.

Before discussing the findings in response to the objectives, it might be helpful to reflect on the value of the information collected about climate studies conducted at parent institutions. We included this topic because it provides information about the degree to which deans might be familiar with climate studies in general, with the way they are conducted, and how their findings are discussed and utilized. In response to the first objective to determine how many US and Canadian dental schools previously participated in a climate study, we found that 46 of the 54 responding schools were located at a parent institution that had conducted at least one climate study. However, it is interesting to consider the difference in the percentages of United States versus Canadian dental schools with climate studies conducted by parent institutions. While 93% of the US respondents reported that their parent institution had done so, only three of the seven Canadian schools (43%) reported that this was the case. Given the smaller number of Canadian dental schools, more research is needed to allow a clear interpretation of this finding. The result that there was also a discrepancy in the percentages of United States (56%) versus Canadian dental schools (14%) that had conducted their own climate study further supports a call for more research concerning these outcomes.

Exploring the considerations of dental school deans who had not previously participated in any climate studies is also interesting. Eight of the US dental schools reported they had not conducted a dental school climate study because their school had been part of the climate study of their parent institutions. Furthermore, five schools were planning to conduct a climate study in the near future. Three of the Canadian schools reported that they were considering a climate study in the future. These numbers show the wider interest in this topic even among schools that had not previously conducted their own study.

Due to the low numbers of responding dental schools from Canada, it is unfortunately not possible to compare the US versus Canadian responses concerning which topics were addressed in climate studies, how data were collected, from whom data were collected, and how the findings affected these academic units. Therefore, Tables 2–6 present the combined responses.

When asked which topics the climate studies at the parent institutions had assessed, the vast majority reported their academic units' climate study assessed the climate overall as well as the climate for specific groups of community members. This result shows that the main focus of these studies was on the third CODA dimension of diversity, namely the institutions' diversity-related climate.[2] This could be related to the use of surveys as the single most widely used methodological approach, followed by focus group methodology, both in the climate studies conducted by the parent institutions as well as by the dental schools. Both of these methods aim at assessing subjective climate-related perceptions and experiences. Gaining a better understanding of how different groups of students, staff, and faculty members experience and perceive their environment is crucial.[25] Research showed how much experienced discrimination affected students' mental health and caused distress.[26] In turn, research with dental students showed the many ways in which increased stress impacted their lives and kept them from living up to their potentials. Stress affected their academic performance,[27,28] mental health such as causing depression[29–31] and anxiety,[32,33] and even destructive lifestyle-related behaviors such as smoking[34] and drug abuse.[35]

Not surprisingly, research also showed that a lack of institutional commitment to diversity, equity, and inclusion was especially detrimental to the achievements and well-being of students, faculty, and staff from historically underrepresented minority (HURM) backgrounds.[36,37] For example, a recent study drew attention to the fact that risk of metabolic syndrome in midlife was significantly lower for Black graduates of historically Black colleges or universities (HBCU) compared to graduates from non-HBCU programs.[38] Creating an inclusive and equitable environment at all dental schools could have

TABLE 6 Responses related to question concerning how likely it would be that the dental school would participate in an ADEA-led joint climate study

Likelihood to participate in ADEA-led joint audit	Dental schools with own study	Dental schools with no study	All dental schools
Likelihood:	$N = 25$	$N = 20$	
1 = not at all likely	0%	0%	0%
2	7%	15%	9%
3	11%	45%	22%
4	37%	15%	24%
5 = very likely	37%	25%	28%
Mean (SD)	4.12 (0.927)	3.50 (1.051) $p = 0.042$[a]	3.84 (1.021)

[a]An independent sample *t*-test was used to test whether the means of the two samples differed significantly.

lifelong positive health implications for students from marginalized groups.

In addition to utilizing surveys and focus groups, record analyses of recruitment and retention efforts to assess structural diversity with objective indicators could complement the subjective indicators accessible with surveys and focus groups. Solid curriculum analyses could complement subjectively assessed perceptions of a lack of curriculum diversity.[2]

A very important final part of this study was to assess the impact of both parent institution and dental school climate studies on the institutions' and dental school communities. The ultimate justification for conducting climate studies is the actual change it can support. Our study showed the far-reaching impact these climate studies had on the dental schools' humanistic environment,[39] on the curriculum, and on the recruitment of faculty, students, and staff members.

This positive evaluation of the potential for change that climate study results can initiate and support, might explain why 74% of the deans or their designees from dental schools that had conducted their own climate study thought their school was likely/very likely to participate in a joint ADEA-led climate study of all dental schools in the United States and Canada. In comparison, the deans from dental schools that had not conducted their own climate study were significantly less likely to respond they would participate in such an endeavor.

While a parent institution and a dental school-specific climate study can provide insights into one academic units' culture, a joint ADEA-led climate study could have additional school-specific as well as dental education-wide benefits. First, one benefit would be to allow each dental school to benchmark its own progress in developing a positive cultural climate against the progress in US and Canadian dental schools overall. Second, it would also be quite beneficial if the outcomes of such a joint climate study included a shared collection of best practices related to increasing diversity, equity, and inclusion in dental school environments. Third, discussing the results of a joint climate study in the schools could raise awareness and increase knowledge about these matters among all dental school community members. Finally, a joint climate study will provide dental schools with much needed and required climate information to support accreditation efforts. Benefits for dental education in general will be that a joint climate study can result in a depository of resources needed for supporting cultural change and coping with challenges caused by discrimination and prejudice. It can provide the empirical evidence needed to develop optimal patient care for patients from different backgrounds and support for communities facing greater access-to-care challenges. It can be a milestone in the journey to assure social justice in dental education.

This research had several limitations. First, the objectives focused only on assessing the current state of climate studies. It was not the objective of this research to ask deans about best practices for future studies. Future research should focus on this objective. Second, as described above, the small number of Canadian respondents did not allow to make subgroup analyses between the US and Canadian schools. Future research should find ways to collect information from all dental schools to assure that such comparisons would be possible. Third, while the response rate was very high, potential response bias might have occurred anyway. It is possible that dental schools with institutional and/or dental school-specific climate studies had been more likely to respond to this survey. The findings should therefore be interpreted with care. Finally, one interesting question would have been to ask the deans why the climate studies in their schools were conducted. Information about the motivation and driving forces behind the conduct of climate studies could be informative, and future research should inquire about this topic.

5 | CONCLUSIONS

Based on these data, it can be concluded that most academic institutions with dental schools in the United States and Canada have conducted at least one climate study in the past decade and about half of the responding dental schools had conducted a climate study in their own academic unit. Most dental schools conducted these studies with internal support and only about one in four dental schools sought consultants from outside their university. Most academic institutions collected information about the overall cultural climate and the climate for specific subgroups of community members. Survey methodology was the primary methodological approach used in parent institution and dental school climate studies. Most studies collected survey data from administrators, faculty, and staff members as well as from students. Relatively fewer dental schools surveyed patients and alumni. Overall, the majority of dental schools reported that the results of their dental school climate studies had positively affected the humanistic environment, curriculum, and recruitment efforts of students and faculty members in their school. Seventy-five percent of the dental schools with experiences with climate studies indicated that their school would be likely/very likely to participate in an ADEA-led joint climate study, while only 40% of the dental schools without a prior climate study thought so.

ACKNOWLEDGMENTS

We thank the Academy for Advancing Leadership (AAL) for technical and coordination support of these efforts and the University of Michigan for the support with the IRB and Qualtrics survey methodology. Special thanks to Dr. Karen West, the CEO and President of the American Dental Education Association (ADEA), for sending an email to the dental school deans, expressing ADEA's support for this study, and to Dr. Sonya G. Smith, the Chief Diversity Officer of ADEA, for supporting this study by providing a list of the deans' emails. We especially want to thank all deans or their designees who took time out of their busy schedules to respond to this survey.

ORCID

Carlos Smith DDS, MDiv https://orcid.org/0000-0002-7311-8515

Marita R. Inglehart Dipl Psych, Dr phil, Dr phil habil https://orcid.org/0000-0001-6279-9581

REFERENCES

1. Colby SF, Ortman JM. *Projections of the Size and Composition of the U.S. Population; 2014–2060*. 2015. United States Census Bureau. https://www.census.gov/content/dam/Census/library/publications/2015/demo/p25-1143.pdf. Accessed June 14, 2021.
2. American Dental Association. Commission on Dental Accreditation. *Accreditation Standards for Dental Education Programs*. Chicago, Illinois; January 2020. https://www.ada.org/~/media/CODA/Files/pde.pdf?la=en. Accessed June 16, 2020.
3. Peterson MW, Spencer MG. Understanding academic culture and climate. *New Dir Institutional Res*. 1990;68:3-18.
4. Hart J, Fellabaum J. Analyzing campus climate studies: seeking to define and understand. *J Divers High Educ*. 2008;1:222-234.
5. Inglehart M, Quiney C, Kotowicz W, et al. Cultural audits: introduction, process, and results. *J Dent Educ*. 1997;61:283-288.
6. Krueger RA. *Focus Groups*. Thousand Oaks, CA: Sage Publications; 1994.
7. Murdoch-Kinch CA, Duff RE, Ramaswamy V, Ester TV, Sponseller SA, Seeley JA. Climate study of the learning environment for faculty, staff, and students at a US dental school: foundation for culture change. *J Dent Educ*. 2017;81:1153-1163.
8. Schneider B, Ehrhart MG, Macey WH. Organizational climate and culture. *Annu Rev Psychol*. 2013;64:361-388.
9. Robinson MA, Reddy MS. Applying corporate climate principles to dental school operations. *J Dent Educ*. 2016;80:1413-1421.
10. McCann AL, Holyfield LA, Schneiderman ED. Assessing campus climate at a US dental school. *Divers Equal Health Care*. 2017;14(6):268-276.
11. Smith CS, Ester TV, Inglehart MR. Recruiting minority middle school students into dentistry – feeding the pipeline. *J Dent Res*. 2006;85(A):#0224.
12. Mayberry ME, Young DD, Sawilowsky S, Hoelscher D. Exposure of seventh and eighth grade urban youth to dentistry and oral health careers. *J Dent Educ*. 2018;82(1):29-38.
13. Inglehart MR, Stefanac SJ, Johnson KP, et al. Recruiting URM high students into dental professions and educating dental students about academic careers. *J Dent Educ*. 2014;78(3):423-436.
14. Johnson KP, Woolfolk MW, May KB, Inglehart MR. Effect of an enrichment program on DAT scores of potential dental students from disadvantaged backgrounds. *J Dent Educ*. 2013;77(8):1065-1073.
15. Markel G, Woolfolk M, Inglehart MR. Feeding the pipeline: academic skills training for pre-dental students. *J Dent Educ*. 2008;72:653-661.
16. Formicola A, Klyvert M, McIntosh J, Thompson A, Davis M, Cangialosi T. Creating an environment for diversity in dental schools: one school's approach. *J Dent Educ*. 2003;67(5):491-499.
17. Mouradian WE, Berg JH, Somerman MJ. Addressing disparities through dental-medical collaborations, part 1. The role of cultural competency in health disparities: training of primary care medical practitioners in children's oral health. *J Dent Educ*. 2003;67(8):860-868.
18. Haden NK, Catalanotto FA, Alexander CJ, et al. Improving the oral health status of all Americans: roles and responsibilities of academic dental institutions. *J Dent Educ*. 2003;67(5):563-583.
19. Hewlett ER, Davidson PL, Nakazono TT, Baumeister SE, Carreon DC, Freed JR. Effect of school environment on dental students' perceptions of cultural competency curricula and preparedness to care for diverse populations. *J Dent Educ*. 2007;71:810-818.
20. Vu MT, McCann A, Schneiderman E, DeWald J, Campbell P, Miller B. The cultural climate of southwest dental colleges: dentistry and dental hygiene. *J Dent Hyg*. 2015;89(1):34-45.

21. Greenhill LM, Carmichael KP. Survey of college climates at all 28 US colleges and schools of veterinary medicine: preliminary findings. *J Vet Med Educ*. 2014;41(2):111-121.
22. Witte TK, Gorczyca K, Chaddock M, Greenhill L, Carmichael P. Denver, CO. https://docs.google.com/document/d/14yzdX3lGCru_LvB-PJtgyY7fbuuetYjZmAYKyFrVRaU/edit#. Accessed April 12, 2021.
23. American Association of Colleges of Nursing. *AACN Diversity & Inclusion Member Needs Survey*. https://www.aacnnursing.org/News-Information/News/View/ArticleId/21308/diversity-survey. Accessed November 12, 2020.
24. Person SD, Jordan CG, Allison JJ, et al. Measuring diversity and inclusion in academic medicine: the Diversity Engagement Survey (DES). *Acad Med*. 2015;90(12):1675-1683.
25. Hardigan PC, Succar CT, Fleisher JM. An analysis of response rate and economic costs between mail and web-based surveys among practicing dentists: a randomized trial. *J Community Health*. 2012;37(2):383-394.
26. McCann AL, Lacy ES, Miller BH. Under-represented minority students' experiences at Baylor College of Dentistry: perceptions of cultural climate and reasons for choosing to attend. *J Dent Educ*. 2014;78:411-422.
27. Sellers R, Copeland-Linder N, Martin PP, 'Heureux Lewis RL. Racial identity matters: the relationship between racial discrimination and psychological functioning in African American adolescents. *J Res Adolesc*. 2006;16(2):187-216.
28. Silverstein ST, Kritz-Silverstein D. A longitudinal study of stress in first-year dental students. *J Dent Educ*. 2010;74(8):836-848.
29. Dahan H, Bedos C. A typology of dental students according to their experience of stress: a qualitative study. *J Dent Educ*. 2010;74(2):95-103.
30. Dyrbye LN, Thomas MR, Shanafelt TD. Systematic review of depression, anxiety, and other indicators of psychological distress among U.S. and Canadian medical students. *Acad Med*. 2006;81(4):54-73.
31. Greene ML, Way N, Pahl K. Trajectories of perceived adult and peer discrimination among Black, Latino, and Asian American adolescents: patterns and psychological correlates. *Dev Psychol*. 2006;42(2):18-36.
32. Basudan S, Binanzan N, Alhassan A. Depression, anxiety and stress in dental students. *Int J Med Educ*. 2017;8:179-186.
33. Jiménez-Ortiz JL, Islas-Valle RM, Jiménez-Ortiz JD, Pérez-Lizárraga E, Hernández-García ME, González-Salazar F. Emotional exhaustion, burnout, and perceived stress in dental students. *J Int Med Res*. 2019;47(9):4251-4259.
34. Gordon NA, Rayner CA. Smoking practices of dental and oral health students at the University of the Western Cape. *SADJ*. 2010;65(7):304-308.
35. Plasschaert AJ, Hoogstraten J, van Emmerik B Jr, Webster D, Clayton RR. Substance use among Dutch dental students. *Community Dent Oral Epidemiol*. 2001;29(1):48-54.
36. Gurin P, Dey E, Hurtado S, Gurin G. Diversity and higher education: theory and impact on educational outcomes. *Harv Educ Rev*. 2002;72(3):330-367.
37. Gurin P, Nagda BRA, Lopez GE. The benefits of diversity in education for democratic citizenship. *J Soc Issues*. 2004;60(1):17-34.
38. Colen CG, Pinchak NP, Barnett KS. Racial disparities in health among college educated African-Americans: can HBCU attendance reduce the risk of metabolic syndrome in midlife? *Am J Epidemiol*. 2021;190(4):553-561.
39. Lyon L, Itaya LE, Hoover T, Booth MT, Nadershahi N. Humanism in dental education: a comparison of theory, intention, and stakeholder perceptions at a North American dental school. *J Dent Educ*. 2017;81(8):929-936.

How to cite this article: Ester TV, Tucker-Lively FL, Smith C, Taylor GW, Ware TK, Inglehart MR. The status of climate studies in the United States and Canadian dental schools: Deans' perspectives. *J Dent Educ*. 2021;85:1616–1626. https://doi.org/10.1002/jdd.12704