STATE OF CALIFORNIA
DEPARTMENT OF CONSUMER AFFAIRS
BUSINESS, CONSUMER SERVICES, AND HOUSING AGENCY • GAVIN NEWSOM, GOVERNOR
DENTAL HYGIENE BOARD OF CALIFORNIA
2005 Evergreen Street, Suite 1350 Sacramento, CA 95815
P (916) 263-1978 | F (916) 263-2688 | www.dhbc.ca.gov

Notice is hereby given that a public meeting of the Licensing and Examination Subcommittee of the Dental Hygiene Board of California (DHBC) will be held as follows:

DHBC Licensing and Examination Committee Meeting Agenda

Friday, October 7, 2022
11:00 a.m. – Adjournment

Pursuant to the provisions of Government Code section 11133, neither a public nor teleconference location is provided. Members of the public may observe or participate using the link below. Due to potential technical difficulties, please consider submitting written comments via email at least five business days prior to the meeting to dhbcinfo@dca.ca.gov for consideration.

Instructions for Meeting Participation

The DHBC will conduct the meeting via WebEx computer program. The preferred audio connection is via telephone conference and not the microphone and speakers on your computer. The phone number and access code will be provided as part of your connection to the meeting. Please see the instructions attached hereto to observe and participate in the meeting using WebEx from a Microsoft Windows-based PC.

For all those who wish to participate or observe the meeting, please log on to the website below. If the hyperlink does not work when clicked on, you may need to place the cursor on the hyperlink, then right click. When the popup window opens, click on "Open Hyperlink" to activate it and join the meeting.

https://dca-meetings.webex.com/dca-meetings/j.php?MTID=m8ebe175504ba202555528736b3f532d7

Event Number ID: 2491 197 7918 Password: DHBC1072022

Audio conference: US Toll Number: +1-415-655-0001
Access code: 249 119 77918
Passcode: 34221072

Licensing and Examination Subcommittee Members:

Carmen Dones, Chair, RDH Educator Member
Sonia "Pat" Hansen, RDH Member
Noel Kelsch, RDHAP Member
Erin Yee, Public Member

The DHBC welcomes and encourages public participation in its meetings. Please see public comment specifics at the end of this agenda.

The DHBC Licensing and Examination Committee may act on any item listed on the agenda, unless listed as informational only.
All times are approximate and subject to change. Agenda items may be taken out of order to accommodate speakers and to maintain a quorum.
The meeting may be cancelled without notice.

Agenda

1. Roll Call & Establishment of Quorum.

2. Public Comment for Items Not on the Agenda.
   [The DHBC may not discuss or act on any matter raised during the Public Comment section that is not included on this agenda, except whether to decide to place the matter on the agenda of a future meeting (Government Code sections 11125 & 11125.7).

3. Discussion and Possible Action on Alternative Pathway to Licensure Taskforce Recommendations and to Provide a Recommendation to the Full Board.

4. Future Agenda Items.

5. Adjournment.

Public comments will be taken on the agenda items at the time the specified item is raised. Government Code section 11125.7 provides the opportunity for the public to address each agenda item during discussion or consideration by the Board prior to the Board taking any action on said item. Members of the public will be provided appropriate opportunities to comment on any issue before the Board, but the Board President may, at his or her discretion, apportion available time among those who wish to speak. Individuals may appear before the Board to discuss items not on the agenda; however, the Board can neither discuss nor take official action on these items at the time of the same meeting (Government Code sections 11125, 11125.7(a)).

A person who needs a disability-related accommodation or modification in order to participate in the meeting may make a request by contacting DHBC at 916-263-1978, via email at dhbcinfo@dca.ca.gov, or by sending a written request to 2005 Evergreen Street, Suite 1350, Sacramento, CA 95815. Providing your request at least five business days prior to the meeting will help to ensure availability of the requested accommodation.

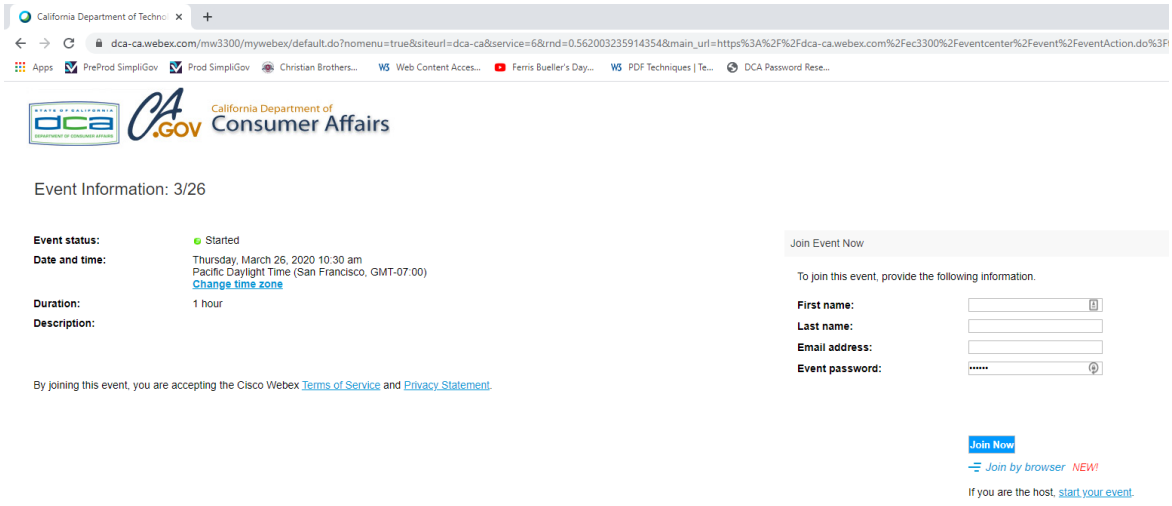
HOW TO – Join – DCA WebEx Event

The following contains instructions to join a WebEx event hosted by the Department of Consumer Affairs (DCA).

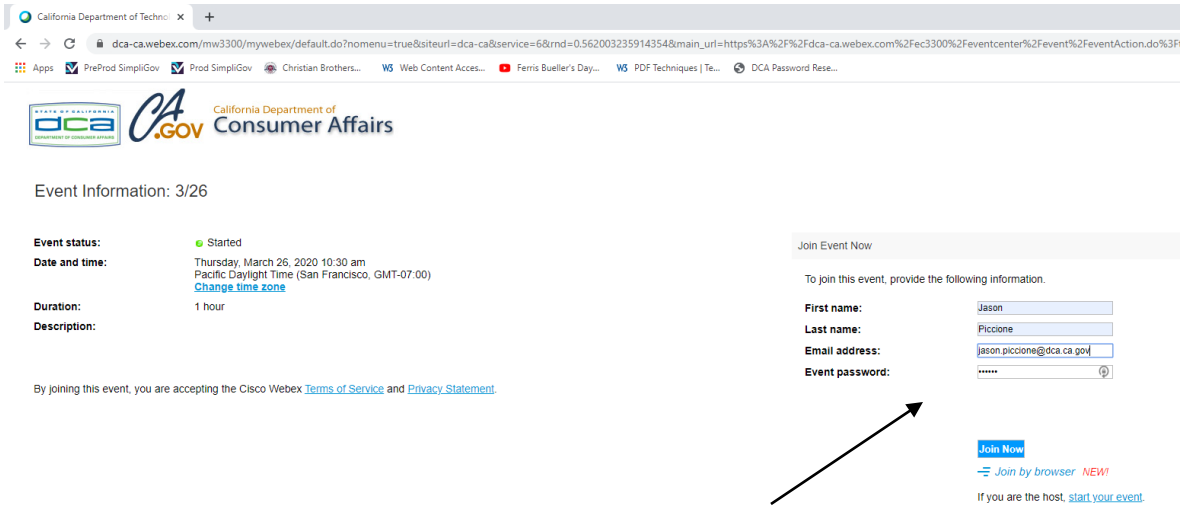
NOTE: The preferred audio connection to our event is via telephone conference and not the microphone and speakers on your computer. Further guidance relevant to the audio connection will be outlined below.

1. Navigate to the WebEx event link provided by the DCA entity (an example link is provided below for reference) via an internet browser.

   Example link:
   https://dca-ca.webex.com/dca-ca/onstage/g.php?MTID=eb0a73a251f0201d9d5ef3aaa9e978bb5



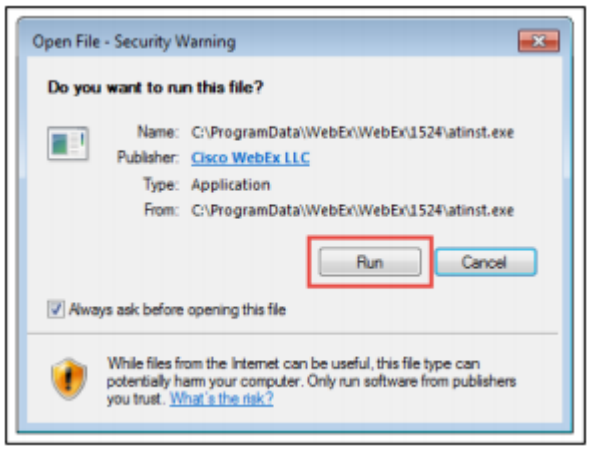
2. The details of the event are presented on the left of the screen and the required information for you to complete is on the right.
   NOTE: If there is a potential that you will participate in this event during a Public Comment period, you must identify yourself in a manner that the event Host can then identify your line and unmute it so the event participants can hear your public comment. The 'First name', 'Last name' and 'Email address' fields do not need to reflect your identity. The department will use the name or moniker you provide here to identify your communication line should you participate during public comment.



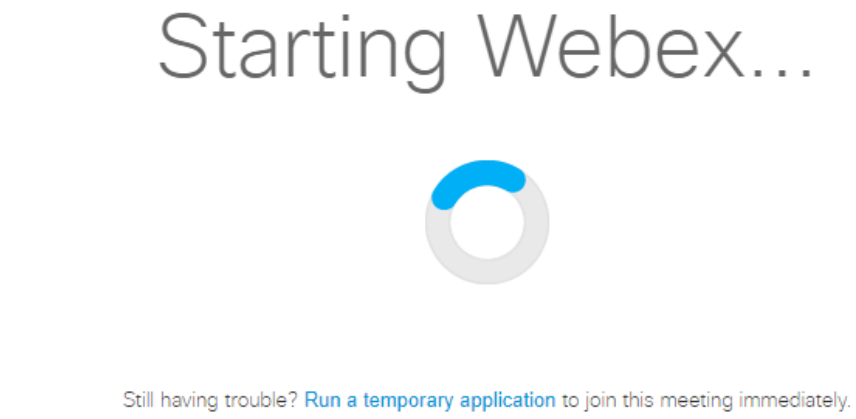
3. Click the 'Join Now' button.

   NOTE: The event password will be entered automatically. If you alter the password by accident, close the browser and click the event link provided again.

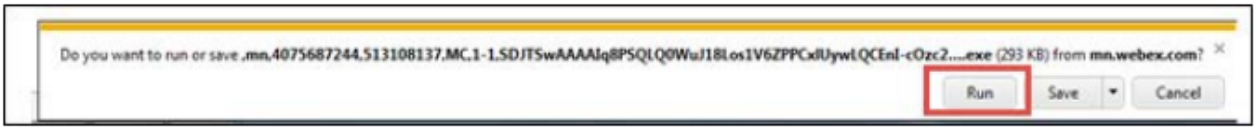
4. If you do not have the WebEx applet installed for your browser, a new window may open, so make sure your pop-up blocker is disabled. You may see a window asking you to open or run new software. Click 'Run'.



Depending on your computer's settings, you may be blocked from running the necessary software. If this is the case, click 'Cancel' and return to the browser tab that looks like the window below. You can bypass the above process.

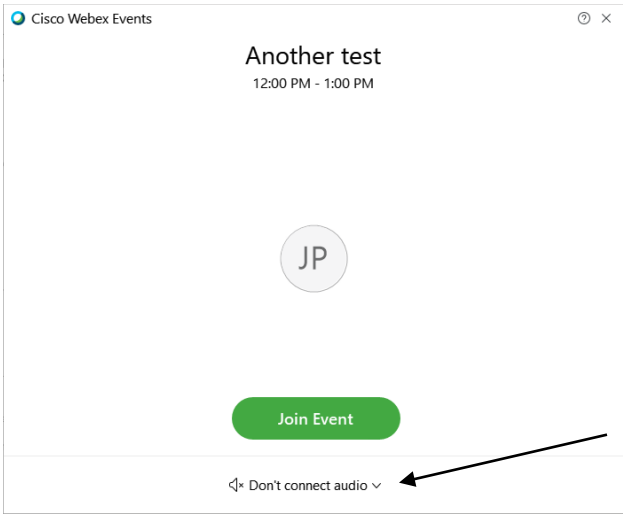


5. To bypass step 4, click 'Run a temporary application'.
6. A dialog box will appear at the bottom of the page, click 'Run'.

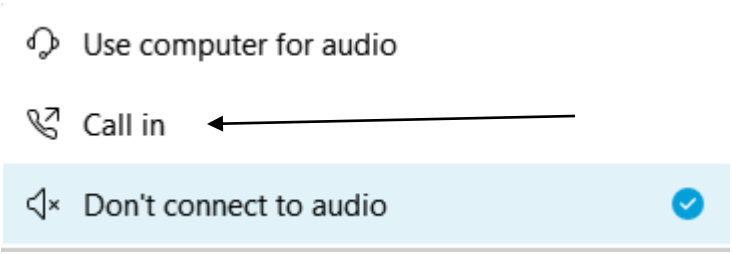


The temporary software will run, and the meeting window will open.

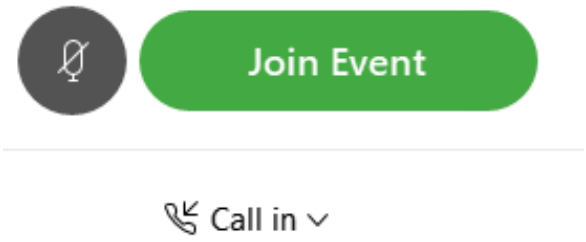
7. Click the audio menu below the green 'Join Event' button.



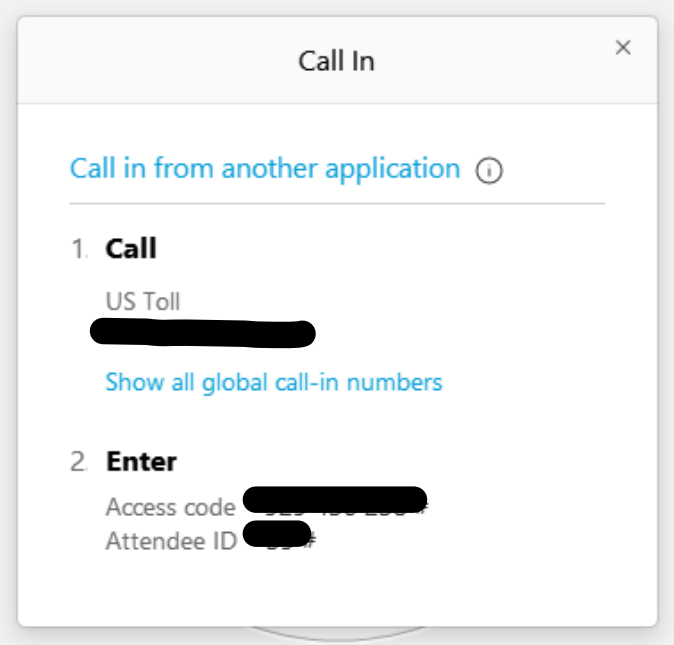
8. When the audio menu appears click 'Call in'.



9. Click 'Join Event'. The audio conference call in information will be available after you join the Event.



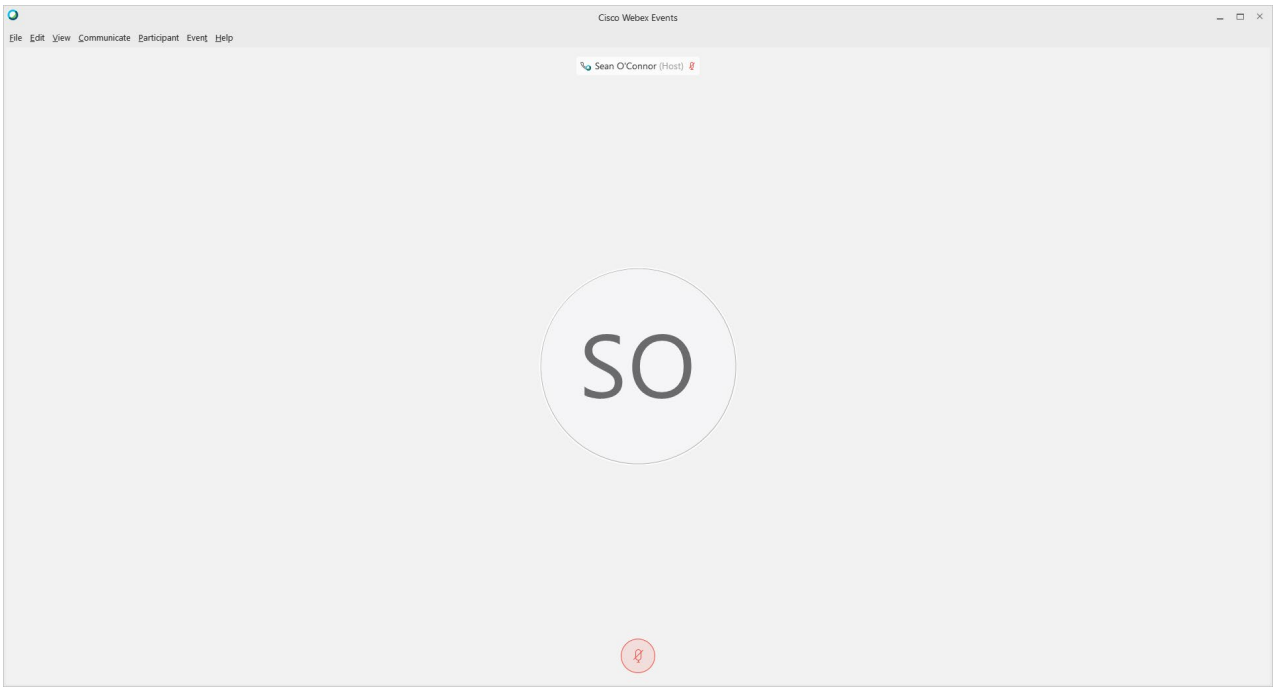
10. Call into the audio conference with the details provided.



NOTE: The audio conference is the preferred method. Using your computer's microphone and speakers is not recommended.

Once you successfully call into the audio conference with the information provided, your screen will look like the screen below and you have joined the event.

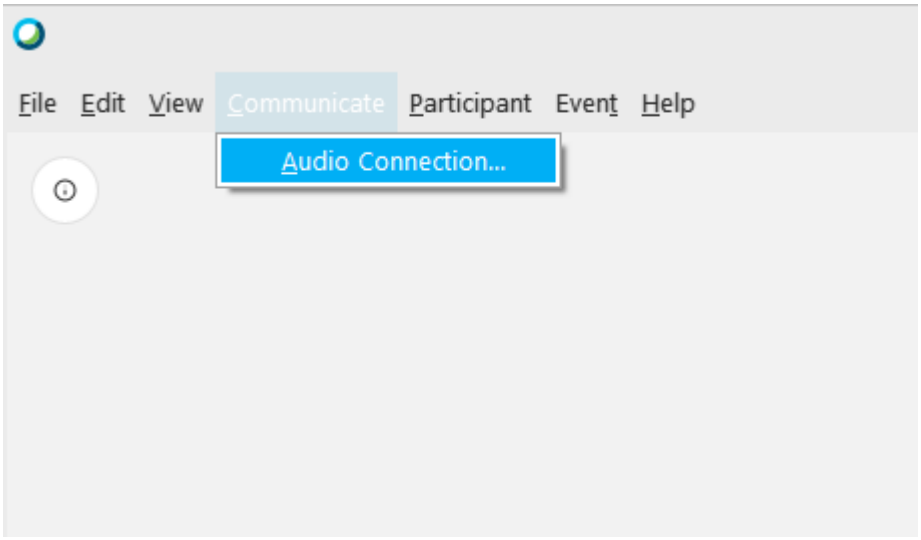
Congratulations!



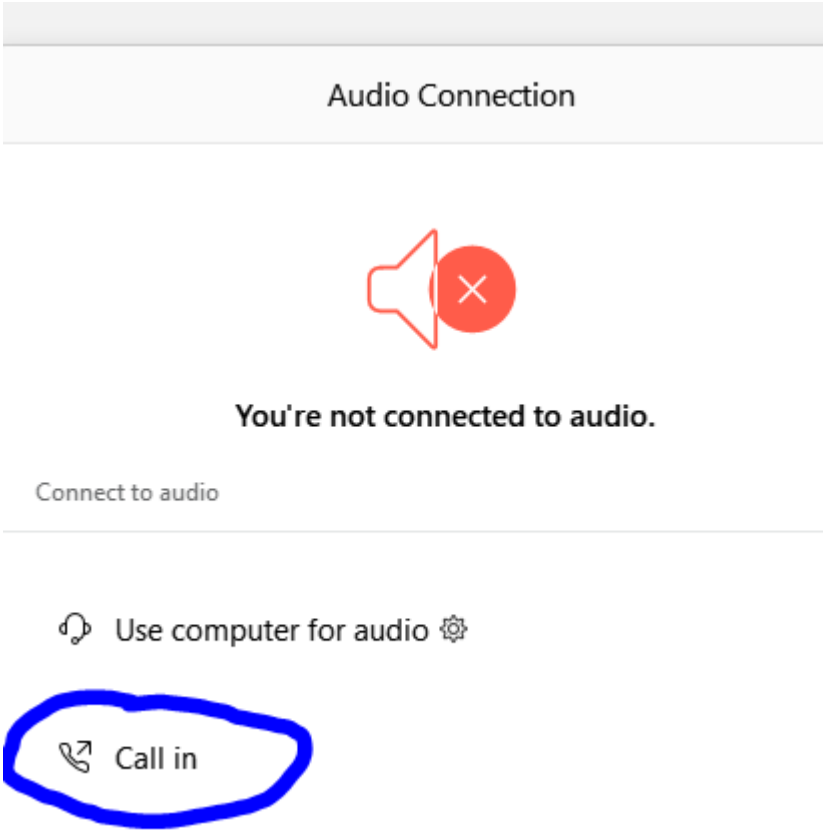
NOTE: Your audio line is muted and can only be unmuted by the event host.

If you join the meeting using your computer's microphone and audio, or you didn't connect audio at all, you can still set that up while you are in the meeting.

Select 'Communicate' and 'Audio Connection' from top left of your screen.



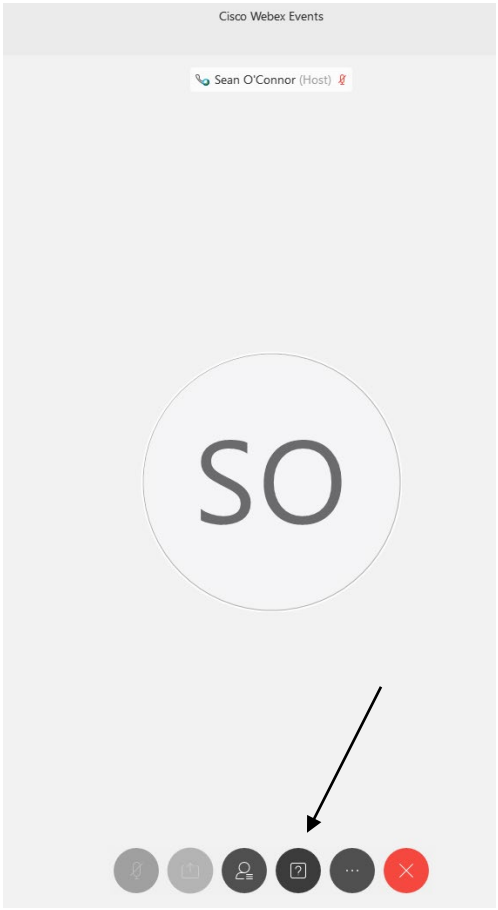
The 'Call In' information can be displayed by selecting 'Call in' then 'View'



You will then be presented the dial in information for you to call in from any phone.

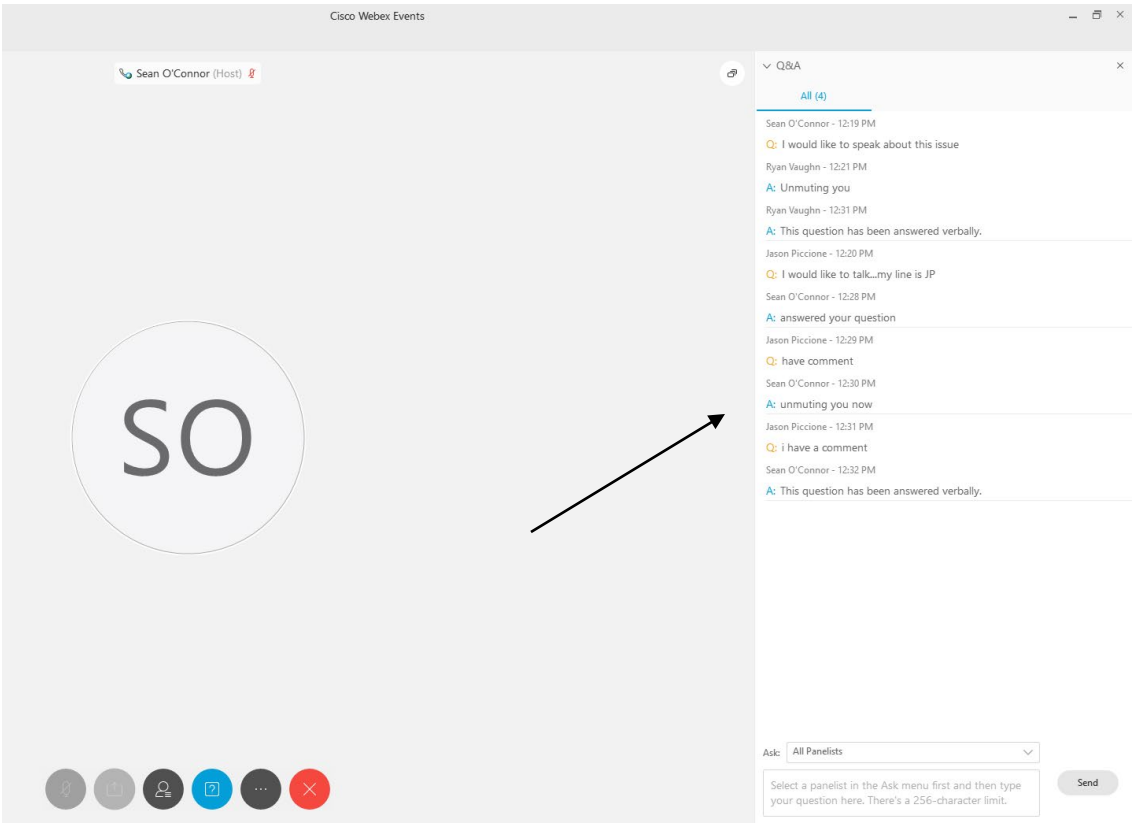
Participating During a Public Comment Period

At certain times during the event, the facilitator may call for public comment. If you would like to make a public comment, click on the 'Q and A' button near the bottom, center of your WebEx session.



This will bring up the 'Q and A' chat box.

NOTE: The 'Q and A' button will only be available when the event host opens it during a public comment period.



To request time to speak during a public comment period, make sure the 'Ask' menu is set to 'All panelists' and type 'I would like to make a public comment'.

Attendee lines will be unmuted in the order the requests were received, and you will be allowed to present public comment.

NOTE: Your line will be muted at the end of the allotted public comment duration. You will be notified when you have 10 seconds remaining.

Member	Present	Absent
Carmen Dones		
Sonia “Pat” Hansen		
Noel Kelsch		
Erin Yee		

Friday, October 7, 2022

Dental Hygiene Board of California
Licensing and Examination Committee

Agenda Item 1

Roll Call & Establishment of Quorum

Board Secretary to call the Roll.

DHBC
Dental Hygiene
Board of California

Friday, October 7, 2022

Dental Hygiene Board of California
Licensing and Examination Committee

Agenda Item 2

Public Comment for Items Not on the Agenda.

[The DHBC may not discuss or act on any matter raised during the Public Comment section that is not included on this agenda, except whether to decide to place the matter on the agenda of a future meeting (Government Code Sections 11125 & 11125.7(a)]

MEMORANDUM

DATE	October 7, 2022
TO	Dental Hygiene Board of California Licensing and Examination Committee
FROM	Anthony Lum Executive Officer
SUBJECT	**LIC 3: Discussion and Possible Action on Alternative Pathway to Licensure Taskforce Recommendations and to Provide a Recommendation to the Full Board**

BACKGROUND

At the March 20, 2021, Board meeting, the Board voted to reconstitute the Alternative Pathways to Licensure (APL) Taskforce that had previously been assembled years before to research optional pathways to dental hygiene licensure than the patient-based clinical examination. The APL Taskforce researched and discussed the issue thoroughly, as it's a very complex task to create alternative options to replace the clinical examination with respect to the law. They met on the following days to discuss alternative options and ideas to bring forth recommendations to the Licensing and Examination Committee:

Thursday, May 20, 2021

Friday, June 4, 2021

Friday, July 2, 2021

Thursday, March 10, 2022

Thursday, July 14, 2022

Thursday, September 22, 2022

After multiple discussions and vetting several options, the taskforce is ready to provide a recommendation for the Licensing and Examination Committee's consideration and approval to present to the Board.

RECOMMENDATION

Staff requests the Licensing and Examination Committee to consider, discuss, and approve the APL Taskforce's recommendations and provide a recommendation to the full Board at their October 8, 2022 WebEx Teleconference.

Requested Sunset Amendments to the Business and Professions Code

Section 1917

The dental hygiene board shall grant initial licensure as a registered dental hygienist (RDH) to a person who satisfies all of the following requirements:

~~(a) Completion of an educational program for registered dental hygienists, approved by the dental hygiene board, accredited by the Commission on Dental Accreditation, and conducted by a degree-granting, postsecondary institution.~~

~~(b) Within the preceding three years, satisfactory completion of the dental hygiene examination given by the Western Regional Examining Board or any other clinical or dental hygiene examination approved by the dental hygiene board.~~

(a) Completion of either of the following:

(1) Satisfactory completion of a California educational program for RDHs, approved by the dental hygiene board, accredited by the Commission on Dental Accreditation, and conducted by a degree-granting, postsecondary institution. If an applicant fails to apply for licensure within three years of completion of a dental hygiene board-approved California educational program for RDHs, the applicant shall be required to satisfactorily complete a dental hygiene licensure examination approved by the dental hygiene board; or

(2) Satisfactory completion of a non-California educational program for RDHs, accredited by the Commission on Dental Accreditation, recognized by the dental hygiene board, and conducted by a degree-granting, postsecondary institution within the United States or Canada, and within three years of the application date satisfactory completion of a dental hygiene licensure examination approved by the dental hygiene board.

~~(c)~~(b) Satisfactory completion of the National Board Dental Hygiene Examination.

~~(d)~~(c) Satisfactory completion of the examination in California law and ethics as prescribed by the dental hygiene board.

~~(e)~~(d) Submission of a completed application form and all fees required by the dental hygiene board.

~~(f)~~(e) Satisfactory completion of dental hygiene board-approved instruction in gingival soft-tissue curettage, nitrous oxide-oxygen analgesia, and local anesthesia.

MEMORANDUM

DATE	March 20, 2021
TO	Dental Hygiene Board of California
FROM	Anthony Lum Executive Officer
SUBJECT	**FULL 8: Discussion and Possible Action on Analysis from the DCA Office of Professional Examination Services (OPES) Regarding the Temporary Acceptance of Mannequin-based Dental Hygiene Clinical Examinations.**

BACKGROUND

Due to the COVID-19 pandemic and associated safety precautions implemented by Governor Newsom and multiple Federal, State, and Local public health agencies to deter the spread of the virus in 2020, registered dental hygienist clinical examination administrators suspended all current patient-based clinical examinations and rescheduled them to future dates. As a result, the dental hygiene class of 2020 were left with no options to complete the clinical examination requirement to apply to obtain a dental hygiene license. At the May 29, 2020 WebEx Teleconference Board meeting, the Board requested and authorized the Department of Consumer Affairs (DCA) Office of Professional Examination Services (OPES) to review all nonpatient-based clinical examinations presented to the Board as an alternative to the live, patient-based clinical examinations. The Western Regional Examination Board (WREB), the Central Regional Dental Testing Services (CRDTS), and the American Board of Dental Examiners, Inc. (ADEX) submitted clinical examination information and data for OPES's review.

At the August 29, 2020 WebEx Teleconference Board meeting and upon conclusion of the review of these alternative examinations, OPES opined that the non-patient-based alternative exams were not a viable option to replace the live, patient-based clinical examinations at that time. Despite OPES's recommendation and due to the class of 2020's predicament, the Board moved to temporarily accept the mannequin-based alternative licensure examinations administered by CRDTS, ADEX, and WREB, when available, in addition to the current patient-based clinical examinations to apply toward Board licensure requirements. The temporary acceptance of these alternative examinations is from August 29, 2020 until March 31, 2021, unless extended.

The original plan was to have a report ready for the Board at the November 21, 2020 WebEx Teleconference Board meeting, but with only two and a half months of exam administrations, there wasn't enough data to report and additional time was needed to provide the Board ample statistics. OPES submitted a memo to the Board that affirmed the lack of statistical data at the time and maintained their original position from the August 29, 2020 Board meeting that the mannequin-based clinical exam is a non-viable

alternative to the patient-based clinical examinations in measuring the skills required for competent dental hygiene practice. The issue was deferred for presentation until the March 20, 2021 Board meeting. Since the November 2020 meeting, staff has been working to request additional mannequin-based data from CRDTS, ADEX, and WREB for OPES to conduct an analysis of the exams.

OPES has obtained additional information from the clinical exam administrators and will provide a presentation and exam analysis for the Board. Because the Board has already extended the temporary acceptance of the alternative mannequin-based clinical exams until August 31, 2021 at the March 6, 2021 meeting, please consider the information and analysis presented for any future decisions on the alternative examinations.

DHBC
Dental Hygiene
Board of California

REVIEW OF THE JOINT COMMISSION ON NATIONAL DENTAL EXAMINATIONS NATIONAL BOARD DENTAL HYGIENE EXAMINATION

STATE OF CALIFORNIA
dca
DEPARTMENT OF CONSUMER AFFAIRS

DENTAL HYGIENE BOARD OF CALIFORNIA

REVIEW OF THE JOINT COMMISSION ON NATIONAL DENTAL EXAMINATIONS NATIONAL BOARD DENTAL HYGIENE EXAMINATION

February 2021

Ruxandra Nunn, M.A., Research Data Specialist II

Karen Okicich, M.A., Research Data Supervisor II

Heidi Lincer, Ph.D., Chief

STATE OF CALIFORNIA
DEPARTMENT OF CONSUMER AFFAIRS
OFFICE OF PROFESSIONAL EXAMINATION SERVICES

This report is mandated by California Business and Professions (B&P) Code § 139 and by DCA Licensure Examination Validation Policy OPES 18-02.

EXECUTIVE SUMMARY

Licensing boards and bureaus within the California Department of Consumer Affairs (DCA) are required to ensure that examination programs used in California licensure comply with psychometric and legal standards. To become a licensed dental hygienist in California, a candidate must have the requisite education and experience and pass three examinations:

1. The National Board Dental Hygiene Examination (NBDHE)
2. The Western Regional Examining Board (WREB) Dental Hygiene Examination or the Central Regional Dental Testing Service (CRDTS) Dental Hygiene Examination
3. The California Registered Dental Hygienist Law and Ethics Examination

The Dental Hygiene Board of California (Board) requested that DCA's Office of Professional Examination Services (OPES) complete a comprehensive review of its examination program. This report is a review of the NBDHE, which is developed by the Joint Commission on National Dental Examinations (JCNDE). OPES performed this review in order to evaluate the suitability of the NBDHE for continued use in California licensure of dental hygienists.

The JCNDE is an independent agency associated with the American Dental Association (ADA). JCNDE develops and administers the NBDHE, a national examination that measures knowledge related to the competencies required for safe, entry-level dental hygiene practice. This examination is required by all dental hygiene licensing agencies in the United States.

OPES, in collaboration with the Board, received and reviewed a report provided by JCNDE that included information regarding an occupational analysis (OA) conducted in 2014–2016. In addition, OPES also reviewed other reports and documents provided by JCNDE regarding practices and procedures used to develop and validate the NBDHE. OPES performed a comprehensive evaluation of the documents to determine whether the following NBDHE components met professional guidelines and technical standards: (a) OA, (b) examination development, (c) passing scores and passing rates, (d) test administration, (e) examination scoring and performance, and (f) test security procedures. Follow-up emails were also exchanged with JCNDE representatives to clarify processes.

OPES found that the procedures used to establish and support the validity and defensibility of the components listed above meet professional guidelines and technical standards outlined in the *Standards for Educational and Psychological Testing* (2014) (*Standards*) and in California Business and Professions (B&P) Code § 139. However, to fully comply with B&P Code § 139 and related policy, OPES 20-01, OPES recommends phasing out the service of board members and educators in examination development processes.

In addition to reviewing documents provided by JCNDE, OPES convened a workshop of California registered dental hygienists in May 2020. The dental hygienists served as subject matter experts (SMEs) to review the content of the NBDHE. The SMEs were selected to represent the profession in terms of geographic location and experience. The purpose of the

review was to compare the content of the NBDHE test specifications with the California registered dental hygienist description of practice that resulted from the OPES 2019 California OA of the Registered Dental Hygienist Profession (California RDH OA, 2019). During this workshop, the SMEs compared the task and knowledge statements from the California description of practice to the examination content of the NBDHE. The linkage study was performed to identify whether there were areas of California dental hygiene practice that are not measured by the NBDHE.

The results of the linkage study indicated that competencies associated with all practice areas included in the California registered dental hygienist description of practice were adequately linked to the content of the NBDHE, except California laws, regulations, and ethics. The SMEs indicated that California laws, regulations, and ethics should continue to be measured by the California-specific Registered Dental Hygienist Law and Ethics Examination.

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CHAPTER 1 | INTRODUCTION

PURPOSE OF THE COMPREHENSIVE REVIEW

Licensing boards and bureaus within the California Department of Consumer Affairs (DCA) must ensure that examination programs used in California licensure comply with psychometric and legal standards. The public must be reasonably confident that an individual passing a licensure examination has the requisite knowledge and skills to competently and safely practice in the profession.

The Dental Hygiene Board of California (Board) requested that DCA's Office of Professional Examination Services (OPES) complete a comprehensive review of the National Board Dental Hygiene Examination (NBDHE) developed by the Joint Commission on National Dental Examinations (JCNDE). The NBDHE is a multiple-choice examination that measures a candidate's knowledge of essential competencies associated with dental hygiene practice.

The OPES review had three purposes:

1. To evaluate the suitability of the NBDHE for continued use in California.

2. To determine whether the NBDHE meets the professional guidelines and technical standards outlined in the *Standards for Educational and Psychological Testing* (2014) (*Standards*[1]) and in California Business and Professions (B&P) Code § 139.

3. To identify any areas of California registered dental hygiene practice that the NBDHE does not assess.

In relation to the *Standards*, evaluating the acceptability of an examination does not involve determining whether the examination satisfies each individual standard interpreted literally. The importance of each standard varies according to circumstances. Page 7 of the *Standards* states:

> Individual standards should not be considered in isolation. Therefore, evaluating acceptability depends on (a) professional judgment that is based on a knowledge of behavioral science, psychometrics, and the relevant standards in the professional field to which the test applies; (b) the degree to which the intent of the standard has been satisfied by the test developer and user; (c) the alternative measurement devices that are readily available; (d) research and experiential evidence regarding the feasibility of meeting the standard; and (e) applicable laws and regulations.

[1] See Chapter 10 for the complete reference to the *Standards.*

OPES, in collaboration with the Board, requested documentation from JCNDE to determine whether the following NBDHE program components met professional guidelines and technical standards outlined in the *Standards* and B&P Code § 139: (a) occupational analysis (OA),[2] (b) examination development, (c) passing scores and passing rates,[3] (d) test administration, (e) examination scoring and performance, and (f) test security procedures.

CALIFORNIA LAW AND POLICY

Section 139 (a) of the California B&P Code states:

> The Legislature finds and declares that occupational analyses and examination validation studies are fundamental components of licensure programs.

It further requires that DCA develop a policy to address the minimum requirements for psychometrically sound examination validation, examination development, and occupational analyses, including standards for the review of state and national examinations.

DCA Licensure Examination Validation Policy OPES 18-02 (OPES 18-02) specifies the *Standards* as the most relevant technical and professional standards to be followed to ensure that examinations used for licensure in California are psychometrically sound, job-related, and legally defensible.

FORMAT OF THE REPORT

The chapters of this report provide the relevant standards related to psychometric aspects of the NBDHE and describe the findings and recommendations that OPES identified during its review.

[2] An occupational analysis is also known as a job analysis, practice analysis, or task analysis.
[3] A passing score is also known as a pass point or cut score.

CHAPTER 2 | OCCUPATIONAL ANALYSIS

STANDARDS

The following standard is most relevant to conducting OAs for licensure examinations, as referenced in the *Standards*:

> **Standard 11.13**
>
> The content domain to be covered by a credentialing test should be defined clearly and justified in terms of the importance of the content for credential-worthy performance in an occupation or profession. A rationale and evidence should be provided to support the claim that the knowledge or skills being assessed are required for credential-worthy performance in that occupation and are consistent with the purpose for which the credentialing program was instituted (pp. 181-182).

The comment following Standard 11.13 emphasizes its relevance:

> **Comment**: Typically, some form of job or practice analysis provides the primary basis for defining the content domain. If the same examination is used in the credentialing of people employed in a variety of settings and specialties, a number of different job settings may need to be analyzed. Although the job analysis techniques may be similar to those used in employment testing, the emphasis for credentialing is limited appropriately to knowledge and skills necessary for effective practice (p. 182).
>
> In tests used for licensure, knowledge and skills that may be important to success but are not directly related to the purpose of licensure (i.e., protecting the public) should not be included (p. 182).

California B&P Code § 139 requires that each California licensing board, bureau, commission, and program report annually on the frequency of its occupational analysis and the validation and development of its examinations. OPES 18-02 states:

> Generally, an occupational analysis and examination outline should be updated every five years to be considered current; however, many factors are taken into consideration when determining the need for a different interval. For instance, an occupational analysis and examination outline must be updated whenever there are significant changes in a profession's job tasks and/or demands, scope of practice, equipment, technology, required knowledge, skills and abilities, or law and regulations governing the profession (p. 4).

FINDINGS

In 2014–2016, JCNDE conducted an OA of the dental hygiene profession. This OA was conducted at the national level, and the results were documented in the Dental Hygiene Practice Analysis and Revision of the NBDHE (JCNDE OA, 2016). Additional information regarding this study was obtained through other technical reports and documentation provided by JCNDE, from JCNDE's website, and through email communication with JCNDE representatives.

Occupational Analysis – Methodology and Time Frame

The purpose of the OA was to help establish evidence of validity to support the use of the NBDHE by state boards in determining the qualifications of candidates seeking licensure to practice dental hygiene (JCNDE OA, 2016). The methodology used to conduct the OA study was an online survey. The survey described the competencies performed by registered dental hygienists, which had been developed and reviewed by the JCNDE and stakeholders in the dental community. The final survey was sent to 43,743 dental hygienists whose information was obtained from the JCNDE's NBDHE administration application files. The survey recipients had been licensed between 2006 and 2015 (JCNDE OA, 2016). In addition, members of the American Dental Hygienists' Association (ADHA) were invited to complete the survey.

> Finding 1: The OA began in 2014 and was completed in 2016. The OA was conducted within a time frame considered to be current and legally defensible.
>
> Finding 2: JCNDE attempts to conduct an OA every 5 years. This interval complies with the DCA policy established under B&P Code § 139, which specifies that, generally, an OA should be conducted every 5 years.

Occupational Analysis – Development of Survey and Sampling Plan

In 2014, the JCNDE initiated an OA of the dental hygiene profession. This OA was conducted at the national level and focused on identifying the competencies required for practice in a majority of states, according to the NBDHE 2020 Candidate Guide.

JCNDE began by reviewing several sources of information regarding the competencies required for dental hygiene practice. These sources included:

1. 56 competencies included on an OA previously conducted by JCNDE in 2009.
2. American Dental Education Association (ADEA) Competencies for Entry into the Profession of Dental Hygiene (ADEA Competencies, 2010).
3. The Commission on Dental Accreditation (CODA) Accreditation Standards for Dental Hygiene Education Programs (CODA Standards, 2012).
4. The ADHA's Standards for Clinical Dental Hygiene Practice (ADHA Standards, 2016).

From these sources, JCNDE consolidated similar competencies and standards into a list of 43 proposed competencies thought to underly dental hygiene practice (JCNDE OA, 2016).[4] These 43 consolidated competencies were incorporated into a preliminary survey that was administered to stakeholders in the dental community: the 2014 NBDHE Competency Survey. These stakeholders were asked to provide feedback regarding the relevance and comprehensiveness of the competencies for dental hygiene practice. In addition, this survey also asked stakeholders to review 17 additional statements that represented skills or activities performed by dental hygienists, and their relationship to the proposed 43 competencies.

In 2015, JCNDE's Committee on Research and Development requested JCNDE staff to group the competencies into one of three clinical component sections or a mixed clinical component section. The grouping was documented in the JCNDE Dental Hygiene Competencies Crosswalk (JCNDE Crosswalk, 2015) and in the 2016 JCNDE OA.

The JCNDE Committee on Dental Hygiene—comprising four joint commissioners, three dental hygienists, and a student representative—then reviewed the competencies and clinical components for redundancy and for adequacy in measuring minimum competence for practice. The resulting list was then also reviewed by representatives from the ADHA. As a result of these reviews, a final list of 30 competency content areas was organized into three clinical component sections: (1) Diagnosis and Treatment Planning, (2) Oral Health Management, and (3) Practice and Profession.

A second preliminary survey comprising this final list of 30 competency content areas within the three clinical component sections was then administered to 6,000 stakeholders in the dental community. This survey was titled the NBDHE Clinical Content Area Survey (NBDHE Content Area Survey, 2015). The purpose of the survey was to confirm that the competency content areas were comprehensive and relevant to current dental hygiene practice and to determine the final set of clinical content areas that would be incorporated into the OA survey.

The 30 competency content areas were then used to develop the final 2016 NBDHE Practice Analysis Survey (JCNDE OA, 2016). The final survey included two sections and was administered to dental hygienists located predominantly in the United States. The first section of the survey comprised demographic questions designed to gather information about the survey respondents and their practice setting. The second section of the survey comprised the 30 competency content areas that were distributed across the three clinical component sections related to dental hygiene practice. In this section, respondents were asked to rate each competency content area on two rating scales: frequency of use in patient care, and importance to patient care. After completing the second section of the survey, respondents were invited to make comments or suggestions.

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[4] The resulting language of the proposed competency statements predominantly reflects the ADEA Competencies.

In rating the frequency of the competency content areas, respondents were asked to consider their work over the past 12 months and to rate how frequently they performed each competency. The response options for this scale included: More than 5 times per day, 3–5 times per day, 1–2 times per day, 1–4 times per week, Less than once per week, Never, and Not applicable (JCNDE OA, 2016).

In rating the importance of the competency content areas, respondents were asked to consider the risk of adverse consequences for the patient if the competency area was neglected. They were then asked to rate each competency area on how important it is to patient care. The responses for this scale included: Extremely important, Very important, Important, Somewhat important, Not important, and Not applicable (JCNDE communication, 2020).

Finding 3: During the development phase, two preliminary surveys were administered to stakeholders for input: the 2014 NBDHE Competency Survey and the 2015 NBDHE Content Area Survey. Of the 137 stakeholders who responded to the first preliminary survey to confirm the relevance and comprehensiveness of competencies, 127 indicated they were dental hygiene program directors or faculty (NBDHE Competency Survey, 2014). Other stakeholders who responded included current and former NBDHE Test Construction Committee members, and the president of a dental hygiene association. Six respondents indicated they were dental hygiene practitioners. Half of the stakeholder respondents indicated they did not spend any hours per week practicing as a dental hygienist. The majority of respondents had been licensed more than 20 years; none had been licensed less than 10 years (NBDHE Competency Survey, 2014). Three stakeholders were from California.

Of the 203 stakeholders who responded to the 2015 NBDHE Content Area Survey, 170 indicated they were practicing dentists (NBDHE Content Area Survey, 2015). It appears that the intended recipients of this survey were dentists; however, nine responses were received from dental hygienists. Nine of these stakeholders were from California.

Finding 4: The predominant stakeholders involved in the 2014 NBDHE Competency Survey were program directors or faculty, approximately half of whom had been licensed more than 20 years. The procedures used by JCNDE to develop the OA survey generally comply with professional guidelines and technical standards; however, the input of newly-licensed practitioners should be included to ensure that knowledge and skills are appropriately defined for entry-level practice.

Occupational Analysis – Sampling Plan and Response Rate

As indicated above, the sampling plan for the OA study included a total of 43,743 dental hygienists (JCNDE sample) (JCNDE OA, 2016). Survey recipients included only those hygienists licensed between 2006 and 2015 in order to maintain an entry-level perspective in identifying the competencies required for safe and effective practice at the time of initial licensure.

An email containing an invitation to complete the online survey was first sent to 21,234 dental hygienists from the JCNDE sample. This group was stratified by year of graduation and state of residence (JCNDE OA, 2016). Due to a low initial response rate, email invitations were then sent to the remaining 22,509 dental hygienists in the JCNDE sample. In addition, the survey was also sent to ADHA members who had been licensed 10 years or less (ADHA sample).

A total of 3,863 respondents from the JCNDE sample and 260 from the ADHA sample opened the online survey. Data from all responses for opened surveys were included in analyses of demographics; however, only data from respondents who rated at least one competency content area were included in further analyses. As a result, data from a total of 2,853 responses from the JCNDE sample were used in analyses of competency area ratings, for a response rate of 6.5%. The total number of dental hygienists in the ADHA sample who received an invitation to complete the survey was not reported.

> Finding 5: The intent of the sampling plan generally complies with professional standards and technical guidelines; the intent was to obtain an entry-level perspective regarding the competencies included on the survey.
>
> Finding 6: The overall response rate for the OA was low. However, the response rate of dental hygienists licensed 5 years or less appears sufficient to ensure that an entry-level perspective was reflected. Approximately 11% of respondents from the JCNDE sample and 6% of the respondents from the ADHA sample who opened the survey were from California (JCNDE OA, 2016). The percentage of dental hygienists from California who provided ratings on competency content areas was not provided. However, based on response rates of those who opened the survey, it appears that ratings of competency content areas likely included a sufficient number of California practitioners to ensure representation of dental hygiene practice in California.

Occupational Analysis – Survey Results

After administering the survey, JCNDE collected the data and analyzed the survey results. Results of analyses from the JCNDE and ADHA were analyzed separately. Results indicated that responses from both samples yielded similar results (JCNDE OA, 2016).

Analyses of mean frequency and importance rating were conducted for competencies within each of the clinical component sections. Ratings obtained on the frequency and importance scales for each competency were then combined using a weighted multiplicative model proposed by Kane, Kingsbury, Colton, & Estes (1989). Using this model, mean frequency ratings were multiplied by weighted mean importance ratings to obtain an overall criticality index for each competency content area (JCNDE OA, 2016).

Based on the criticality indices for all competency content areas, a preliminary determination was made about the number of items that would be allocated (or reallocated) to each of the existing content areas included on the NBDHE (JCNDE OA, 2016).

> Finding 7: Survey respondents were licensed dental hygienists located throughout the United States, all of whom had been practicing for 10 years or less. Approximately 76% of the respondents from the JCNDE sample and 60% of those from the ADHA sample reported that they had been practicing for less than 5 years (JCNDE OA, 2016). The majority of respondents (61% from both samples) reported that they worked 31–40 hours a week as a dental hygienist, while 35% of the JCNDE sample and 26% (approximately) of the ADHA sample indicated that they worked 11–30 hours per week (JCNDE OA, 2016). In addition, the majority of respondents from both the JCNDE and ADHA samples (79% and 75%, respectively) categorized their primary work setting as a private general practice. The demographic data indicate that ratings provided by respondents licensed 5 years or less appear to be sufficient to ensure that an entry-level perspective was achieved, and the respondents appear representative of general dental hygiene practice.

Occupational Analysis – Development of Test Specifications

In October 2016, a Test Specifications Practice Analysis Review Panel (Panel) reviewed the results of the OA survey. The Panel included 11 members, including: 5 joint commissioners, 4 practicing dental hygienists, and 2 dental hygiene educators from accredited dental hygiene programs (JCNDE OA, 2016). Panelists reviewed the mean frequency ratings, mean importance ratings, and the overall criticality of ratings for each of the competency content areas. In addition, they reviewed the list of 30 competency content areas in conjunction with the content assessed on the NBDHE.

The Panel then linked the results of the OA with the disciplines assessed on the NBDHE (JCNDE OA, 2016). The Panel also ensured that the distribution of items in each of the disciplines reflected the relative importance and frequency of each of the competency content areas, as identified in the OA. The Panel reviewed the results of ratings on competency content

areas from both the JCNDE sample and the ADHA sample and reached a consensus about the number of items that should be devoted to each of the disciplines and subdisciplines on the NBDHE. The results of this review resulted in a recommendation for the new test specification for the NBDHE.

In 2017, the Committee on Research and Development and the Committee on Dental Hygiene reviewed the practice analysis survey results and approved the Panel's recommended test specifications. The new test specification was subsequently adopted by JCNDE and was reflected in NBDHE forms beginning in 2019.

> Finding 8: The processes used to establish a link between competencies identified by the OA as required for entry-level practice and the disciplines of the NBDHE demonstrate a sufficient level of validity, thereby meeting professional guidelines and technical standards.

RECOMMENDATIONS

> Recommendation 1: OPES recommends that JCNDE increase the participation of dental hygiene practitioners in the development of future OAs. In addition, SMEs involved in the development process should represent the profession in terms of geographic location and level of experience. OPES further recommends that JCNDE include practitioners licensed 5 years or less in subsequent OA development processes.

CONCLUSIONS

Given the findings, the OA conducted by JCNDE appears to meet professional guidelines and technical standards. Additionally, the development of the test specifications for the NBDHE is based on the results of the most recent OA and appears consistent with professional guidelines and technical standards. OPES recommends that JCNDE modify future OA development processes to include actively practicing dental hygienists and to include SMEs who represent the practice in terms of experience level. Because the results of the OA form the basis of the NBDHE, entry-level practitioners (licensed 5 years or less) should be involved in these processes.

CHAPTER 3 | EXAMINATION DEVELOPMENT

STANDARDS AND REGULATIONS

Examination development includes many steps within an examination program, from the development of an examination content outline to scoring and analyzing items after the administration of an examination. Several specific activities involved in the examination development process are evaluated in this section. The activities include development of examination content, linkage of examination content to the examination outline, and development of the scoring criteria and the examination forms.

The following standards are most relevant to examination development for licensure examinations, as referenced in the *Standards.*

> **Standard 4.7**
>
> The procedures used to develop, review, and try out items and to select items from the item pool should be documented (p. 87).
>
> **Standard 4.12**
>
> Test developers should document the extent to which the content domain of a test represents the domain defined in the test specifications (p. 89).

The following regulations are relevant to the integrity of the examination development process:

> California B&P Code § 139 requires DCA to develop a policy on examination validation which includes minimum requirements for psychometrically sound examination development.
>
> DCA Policy Participation in Examination Development OPES 20-01 (OPES 20-01), as mandated by B&P Code § 139, specifies that board members, committee members, and instructors should not serve as expert consultants in the licensure examination development process. This is due to potential conflict of interest, undue influence, and security considerations.

FINDINGS

The information below about the NBDHE is included in the 2018–2019 Technical Report on the NBDHE (NBDHE Technical Report, 2020).

The NBDHE consists of 350 multiple-choice items and comprises two components (NBDHE Candidate Guide, 2020). The first component is discipline-based. This component consists of 200 items across three major areas related to dental hygiene practice. These disciplines include: Scientific Basis for Dental Hygiene Practice (organized into six subdisciplines),

Provision of Clinical Dental Hygiene Services (organized into seven subdisciplines), and Community Health/Research Principles (organized into three subdisciplines).

The second component is case-based. It consists of 150 items involving 12–15 dental hygiene patient cases. Cases in this section include at least one case (or scenario) involving geriatric, adult-periodontal, pediatric, special needs, and medically compromised patients. Case-based items involve the presentation of patient histories, dental charts, radiographs, and clinical photographs. These questions are designed to evaluate a candidate's ability to assess patient characteristics, interpret clinical information, plan dental hygiene care, perform periodontal procedures and use preventative agents, and provide supportive treatments.

The NBDHE also uses testlet items, which present a case study or problem and a set of 4–5 associated questions.

In July 2020, JCNDE began administering a short-form version of the NBDHE on a temporary basis to address testing backlogs associated with COVID-19 (JCNDE website, https://www.ada.org/en/jcnde). This shortened version comprises 155 multiple choice items: 85 discipline-based items, and 70 case-based items. JCNDE has stated that reliability and validity of the short form have been thoroughly investigated. "The shortened version of the NBDHE has undergone thorough psychometric investigation within the Department of Testing Services; there is strong validity and reliability evidence to support usage of the short-form NBDHE" (JCNDE website).

> Finding 9: JCNDE has provided results of reliability estimates for the short form. JCNDE provided estimates of classification consistency (.95), classification accuracy (.92–.95), and Kuder-Richardson 20 (KR20) reliability among short-form versions of the NBDHE. These estimates indicated an acceptable level of these indices (NBDHE Quick Facts, 2020). Further, the short form is a proportional representation of the test specifications resulting from the most recent OA for the long-form NBDHE. The passing score for the short form appears to be based on the passing standard set in 2015 for the long-form NBDHE.
>
> JCNDE has indicated on its website that it intends to maintain the short-form NBDHE until the backlog of candidates is resolved. Once this happens, JCNDE will make a determination about future testing (JCNDE website).

Examination Development – Subject Matter Experts (SMEs)

Examination development for the NBDHE is performed by SMEs who serve as test constructors, according to the 2019 JCNDE Test Construction Teams and Selection Criteria (JCNDE Construction Teams Manual, 2019). Potential test construction SMEs must provide evidence that specific qualification criteria have been met, including credentials demonstrating subject matter expertise (JCNDE Construction Teams Manual, 2019). Potential test construction

SMEs must have graduated from an accredited program and must possess the following expertise in one of eight areas:

1. Biomedical Sciences – doctoral degree, dentist or dental hygienist with advanced biomedical education beyond entry-level dental hygiene education, and a minimum of three years' teaching experience in the past 5 years.
2. Radiology – dentist or dental hygienist with baccalaureate degree from accredited program, oral and maxiofacial radiologist or dental hygienist with education beyond entry-level dental hygiene education, and a minimum of 3 years' teaching experience in the past 5 years.
3. Periodontics (Periodontist) – graduate from an accredited dental program with advanced education in periodontics, and a minimum of 3 years' teaching periodontics in the past 5 years.
4. Periodontics (Dental Hygienist) – graduate from an accredited dental hygiene program, and a minimum of 3 years' teaching periodontics in the past 5 years.
5. Oral Medicine/Oral Diagnosis/Oral Pathology – dentist or dental hygienist with advanced education or experience, and 3 years' experience teaching in oral medicine/oral diagnosis/oral pathology in the past 5 years.
6. Special Needs Professional – dentist or dental hygienist with advanced clinical experience or education with special needs populations, and 3 years' experience teaching in a relevant subject area in the past 5 years.
7. Dental Hygiene Curriculum – dental hygienist with advanced degree in dental hygiene, experience in curriculum design, program director, curriculum committee, or consultant, and 3 years' teaching experience or clinical experience in dental hygiene in a private or faculty practice setting.
8. Clinical Dental Hygiene – dental hygienist with a baccalaureate degree in dental hygiene, education, or biomedical science, and a minimum of 3 years of teaching or practicing dental hygiene in the past 5 years.
9. Community Dental Health – dentist or dental hygienist with advanced education in public health or community dental health (JCNDE Construction Teams Manual, 2019).

Once approved, each test constructor SME receives the following materials: Test Item Development Guide, Orientation Manual for Test Constructors, Dental Hygiene Examination Specifications, and Acceptance Form. New test constructors also receive a style manual for producing items for the NBDHE and are mentored by returning test constructors.

> Finding 10: The criteria used to select test construction SMEs appear relatively consistent with professional guidelines and technical standards. However, the use of educators in examination development processes is not fully compliant with OPES 20-01, as mandated by B&P Code § 139.

Examination Development – Linkage to Examination Blueprint

In October 2016, the Panel convened to link the competency content areas derived from the 2016 JCNDE OA with the disciplines and subdisciplines covered on the NBDHE (JCNDE OA, 2016). The Panel provided a recommendation regarding the number of examination items that should be devoted to each of the OA competency content areas and the number of items devoted to each discipline and subdiscipline. In 2017, the Committee on Research and Development and the Committee on Dental Hygiene approved the Panel's recommendation for the new NBDHE test specifications. Subsequently, JCNDE adopted the updated test specifications for the NBDHE.

> Finding 11: The methods used to establish a link between examination content and the competencies necessary for practice appear consistent with professional guidelines and technical standards.

Examination Development – Item Development and Pilot Testing

Each year, JCNDE appoints test construction SMEs to Test Construction Teams (TCTs) (NBDHE Technical Report, 2020). Six TCTs work together to develop the content of the NBDHE. Test construction SMEs are responsible for reviewing test specifications to ensure that they reflect current practice, for submitting new examination items, and for constructing examination forms.

The TCTs are divided into two groups: Component A teams are responsible for developing and reviewing discipline-based items, and Component B teams develop and review case-based items.

New items are reviewed by test construction SMEs during TCT meetings. In addition, new items are included on NBDHE forms as experimental items (pretest items) and are not counted toward a candidate's score. Item analyses are then performed, and the statistical performance of these items is reviewed by SMEs at TCT meetings to determine whether the items meet criteria for inclusion on future examination forms (NBDHE Technical Report, 2020). In evaluating item performance, SMEs consider indices of both item difficulty and item discrimination. Items that do not meet defined performance criteria are returned for revision or are eliminated.

> Finding 12: The procedures used to develop, review, and field test new items appear consistent with professional guidelines and technical standards. However, the service of educators in examination development processes is not fully compliant with OPES 20-01, as mandated by B&P Code § 139.

Examination Development – Examination Forms

Examination forms for the NBDHE are constructed by TCTs based on the examination specifications. Throughout the construction process, test constructor SMEs ensure that examination content reflects current practice (NBDHE Technical Report, 2020). In addition, all examination forms are constructed using the same criteria to ensure that forms are comparable in terms of content and item difficulty. Examination forms also include anchor items to equate alternate forms of the NBDHE.

Final forms of the NBDHE are reviewed by a Consultant Review Team consisting of four test constructor SMEs. This team reviews examinations to ensure consistency and coherence of both the Component A and Component B sections of each examination form (NBDHE Technical Report, 2020).

> Finding 13: The procedures used to construct NBDHE forms appear consistent with professional guidelines and technical standards. However, the use of educators in examination development processes is not fully compliant with OPES 20-01, as mandated by B&P Code § 139.

RECOMMENDATIONS

> Recommendation 2: In addition to ensuring that examinations are valid, California boards are required to ensure that they are fair to candidates and do not create artificial barriers to practice. If sufficient evidence of reliability and validity exists to support the use of the short-form NBDHE as a measure of competence for dental hygiene practice, OPES recommends that this form be maintained or that a strong psychometric justification be provided for returning to the full-length form.

> Recommendation 3: OPES recognizes that JCNDE includes educators in examination development processes in order to obtain information regarding the education that dental hygienists receive. In order to be fully compliant with OPES 20-01, OPES recommends phasing out or limiting the service of educators during examination development processes.

CONCLUSIONS

Given the findings, the examination development procedures conducted by JCNDE appear consistent with professional guidelines and technical standards. To reduce the potential for conflict of interest during examination development processes, OPES recommends phasing out the service of educators and increasing the service of dental hygienists who are providing clinical services.

The COVID-19 pandemic has created profound challenges to test administration, and OPES commends JCNDE's efforts to improve the efficiency of test administration. JCNDE stated that it thoroughly investigated reliability and validity evidence before making changes to the length of

the NBDHE. Provided reliability and validity evidence support the use of the short-form NBDHE, OPES recommends that JCNDE continue the use of this form once testing backlogs have resolved. Alternately, a compelling psychometric justification for returning to the full-length form should be provided. In the absence of such justification, a return to the full-length form would be unfair to candidates and potentially create an artificial barrier to practice.

CHAPTER 4 | PASSING SCORES AND PASSING RATES

STANDARDS

The passing score of an examination is the score that represents the level of performance that divides those candidates for licensure who are minimally competent from those who are not competent.

The following standards are most relevant to passing scores, cut points, or cut scores for licensure examinations, as referenced in the *Standards.*

> **Standard 5.21**
>
> When proposed score interpretations involve one or more cut scores, the rationale and procedures used for establishing cut scores should be documented clearly (p. 107).
>
> **Standard 11.16**
>
> The level of performance required for passing a credentialing test should depend on the knowledge and skills necessary for credential-worthy performance in the occupation or profession and should not be adjusted to control the number or proportion of persons passing the test (p. 182).

The supporting commentary on passing or cut scores in Chapter 5 of the *Standards*, "Scores, Scales, Norms, Score Linking, and Cut Scores" states that the standard setting process used should be clearly documented and defensible. The qualifications and the process of selection of the judges involved should be part of the documentation. A sufficiently large and representative group of judges should be involved, and care must be taken to ensure that judges understand the process and procedures they are to follow (p.101).

In addition, the supporting commentary in Chapter 11 of the *Standards*, "Workplace Testing and Credentialing" states that the focus of tests used in credentialing is on "the standards of competence needed for effective performance (e.g., in licensure this refers to safe and effective performance in practice)" (p. 175). It further states, "Standards must be high enough to ensure that the public, employers, and government agencies are well served, but not so high as to be unreasonably limiting" (p. 176).

OPES 20-01, as mandated by B&P Code § 139, specifies that board members, committee members, and instructors should not serve as expert consultants in the licensure examination development process. This is due to potential conflict of interest, undue influence, and security considerations.

FINDINGS

Passing Scores – The NBDHE Process, Participation of SMEs, and Methodology

The NBDHE uses a criterion-referenced passing standard that is set on a base form of the examination. A bookmark procedure was used to establish the passing standard, which relies on the expert judgment of SMEs to determine the knowledge a candidate should possess in order to be "just qualified" (minimally qualified) for safe and effective dental hygiene practice.

To determine the passing standard, a panel with SMEs was held in 2015, according to the 2015 Report on Standard Setting for the NBDHE (Standard Setting Report, 2015). Twelve SMEs participated in this panel, comprising five dental hygienists, four dentists, and three educators. The panel was facilitated by a psychometrician.

SMEs were first provided with information about the NBDHE OA, test specifications, and examination development processes (Standard Setting Report, 2015). SMEs were also provided with information about passing standards and the bookmark standard setting process. The SMEs then self-administered an abbreviated form of the NBDHE that was representative of the NBDHE full form. The intent of this activity was to have SMEs experience the item formats, level of challenge, and test-taking conditions experienced by candidates. After this activity, the SMEs participated in another activity aimed at understanding the concept of the "Just Qualified Candidate" (minimally competent candidate), followed by a session of practice ratings and subsequent discussion.

After the practice session and discussion, the SMEs worked collectively during three rounds to provide bookmark judgments/placements for operational items (Standard Setting Report, 2015). At the end of each round, analyses were conducted on the recommended bookmark placements. The passing standard was derived from the median of the SMEs' bookmark placements. The criterion-referenced passing standard was then used to adjust the scale used to score the NBDHE to a consistent passing score (NBDHE Candidate Guide, 2020).

Item Response Theory (IRT) was used to statistically produce equivalent scores on alternate forms of the NBDHE based on this score scale and criterion-referenced passing standard. Scaled scores on the NBDHE can range from 49–99, and candidates must achieve a score of 75 or higher to pass the NBDHE.

The passing standard from the 2015 bookmark procedure was approved by JCNDE in 2016 and implemented in 2017. Passing standards are periodically reviewed by SMEs and by JCNDE to ensure that they continue to reflect the knowledge required for safe, entry-level practice. When passing standards are updated, modifications are made to the score scale so that a score of 75 continues to reflect the minimum passing score (NBDHE Candidate Guide, 2020).

Finding 14: The number of SMEs used in setting the passing standard meets professional guidelines and technical standards. However, the use of educators in the process is not fully compliant with OPES 20-01, as mandated by B&P Code § 139.

Finding 15: The methods used to set the passing standard for the NBDHE and scale scores on alternate forms generally appear consistent with professional guidelines and technical standards.

PASSING RATES

JCNDE tracks annual passing rates for the NBDHE. This data is provided for first-time and repeat test takers who attended accredited and non-accredited dental hygiene programs. OPES reviewed the pass rates for 2017–2019, which correspond with the implementation of the current passing standard. Passing rates for 2020 administrations were not available at the time of this report.

Finding 16: The overall passing rate for first-time test takers from accredited programs for the period analyzed was 92–94% (approximately), while pass rates for repeat test takers was 50–54% (approximately). The pass rates for first-time test takers coming from non-accredited programs during the period ranged from 65–67% (approximately), while the pass rate for repeat test takers ranged from 49–56% (approximately). The overall pass rate across all candidates was 86–89%.

Data were not provided regarding the pass rates for California candidates.

RECOMMENDATIONS

Recommendation 4: In order to be fully compliant with OPES 20-01, OPES recommends phasing out or limiting the service of board members and educators during examination development processes.

Recommendation 5: OPES recommends that JCNDE provide data regarding pass rates for California candidates so that specific evaluations can be made of the performance of candidates in California.

CONCLUSIONS

Given the findings, the passing score methodologies used by JCNDE to set the passing standard and scale scores on the NBDHE demonstrate a sufficient degree of validity, thereby meeting professional guidelines and technical standards.

The pass rates for the NBDHE indicate that, overall, candidates tend to perform very well. First-time test takers who come from accredited programs tend to perform better than those who come from non-accredited programs. In addition, first-time test takers tend to perform better than repeat test takers. This is consistent with pass rate patterns observed in other high-stakes licensure programs. OPES recommends that the NBDHE provide data for California candidates so that an evaluation of state-specific performance can be made.

CHAPTER 5 | TEST ADMINISTRATION

STANDARDS

The following standards are most relevant to the test administration process for licensure examinations, as referenced in the *Standards.*

Standard 3.4

Test takers should receive comparable treatment during the test administration and scoring process (p. 65).

Standard 4.15

The directions for test administration should be presented with sufficient clarity so that it is possible for others to replicate the administration conditions under which the data on reliability, validity, and (where appropriate) norms were obtained. Allowable variations in administration procedures should be clearly described. The process for reviewing requests for additional testing variations should also be documented (p. 90).

Standard 4.16

The instructions presented to test takers should contain sufficient detail so that test takers can respond to a task in the manner that the test developer intended. When appropriate, sample materials, practice or sample questions, criteria for scoring, and a representative item identified with each item format or major area in the test's classification or domain should be provided to the test takers prior to the administration of the test or should be included in the testing material as part of the standard administration instructions (p. 90).

Standard 6.1

Test administrators should follow carefully the standardized procedures for administration and scoring specified by the test developer and any instructions from the test user (p. 114).

Standard 6.2

When formal procedures have been established for requesting and receiving accommodations, test takers should be informed of these procedures in advance of testing (p. 115).

Standard 6.3

Changes or disruptions to standardized test administration procedures or scoring should be documented and reported to the test user (p. 115).

Standard 6.4

The testing environment should furnish reasonable comfort with minimal distractions to avoid construct-irrelevant variance (p. 116).

Standard 6.5

Test takers should be provided appropriate instructions, practice, and other support necessary to reduce construct-irrelevant variance (p. 116).

Standard 8.1

Information about test content and purposes that is available to any test taker prior to testing should be available to all test takers. Shared information should be available free of charge and in accessible formats (p. 133).

Standard 8.2

Test takers should be provided in advance with as much information about the test, the testing process, the intended test use, test scoring criteria, testing policy, availability of accommodations, and confidentiality protection as is consistent with obtaining valid responses and making appropriate interpretations of test scores (p. 134).

FINDINGS

JCNDE contracts with Pearson VUE, a national test administration vendor, to administer the NBDHE (NBDHE Candidate Guide, 2020). The NBDHE is administered throughout the calendar year via computer at over 280 Pearson VUE testing centers and thousands of Pearson VUE authorized testing centers in the U.S., U.S. territories, and Canada. A brief optional tutorial is provided before the examination begins. The tutorial familiarizes candidates with computer operation and the steps involved in proceeding through the examination.

JCNDE provides information about the NBDHE and test administration to candidates and prospective candidates through its website at https://www.ada.org/en/jcnde.

Test Administration – Candidate Registration

Candidates register to take the NBDHE by first obtaining a Dental Personal Identification Number (DENTPIN) and submitting an application through the ADA Department of Testing Services (DTS) website at https://dts.ada.org/login/login__ADA.aspx. After applications have been processed, candidates receive an email with scheduling instructions.

The JCNDE website and the NBDHE 2020 Candidate Guide provide detailed instructions and information regarding the application and registration process, including:

- Application procedures
- Examination fees
- Examination schedule
- Rescheduling or canceling a test appointment
- Policies regarding re-application and eligibility for re-examination

Finding 17: The NBDHE registration process appears straightforward. The information available to candidates is detailed and comprehensive. The candidate registration process appears to meet professional guidelines and technical standards.

Finding 18: JCNDE implements a re-administration policy that requires candidates to wait 90 days before reapplying for the examination. JCNDE also implements a Five Year/Five Attempts Eligibility Rule. This rule specifies that candidates must pass the examination within 5 years of their first attempt or within five attempts, whichever comes first. This policy is consistent with industry standards for high-stakes licensure programs and is clearly specified on the JCNDE website and in the NBDHE 2020 Candidate Guide.

Test Administration – Accommodation Requests

JCNDE complies with the Americans with Disabilities Act and provides reasonable accommodations to candidates with documented disabilities or medical conditions. In addition to an application to test, candidates who require testing accommodations must submit a Testing Accommodations Request Form that indicates the accommodation requested to address functional limitations (NBDHE Candidate Guide, 2020). In addition, candidates are also required to submit an evaluation report completed by a qualified health care professional within the past 5 years that includes information regarding the candidate's disability or diagnosis and recommendations for accommodation.

In considering requests for accommodation, JCNDE maintains a focus on the validity of the examination and on providing candidates with the "opportunity to demonstrate their knowledge and [cognitive] skills, as opposed to having the measurement of their knowledge and [cognitive] skills inappropriately reflect a disability" (NBDHE Candidate Guide, 2020, p. 19).

Finding 19: JCNDE's accommodation procedures appear consistent with professional guidelines and technical standards.

Test Administration – Test Centers

The full-length NBDHE is administered over a nine-hour time period at Pearson VUE testing centers or Pearson VUE authorized testing centers. The short-form NBDHE (beginning in July 2020) is administered over 3 hours and 35 minutes at these same locations. Pearson VUE testing centers and authorized testing centers are located throughout the U.S and its territories, and in Canada (JCNDE website).

> Finding 20: Candidates have access to thousands of authorized testing centers that administer the NBDHE. These centers have trained proctors and controlled testing conditions.

Test Administration – Directions and Instructions to Candidates

The JCNDE website provides detailed information about the NBDHE. In addition, the NBDHE 2020 Candidate Guide provides detailed information to candidates regarding:

- Purpose of the examination and dental hygiene licensure
- Examination specifications
- Examination preparation and resources
- Practice tests
- Examination scoring and results
- Eligibility requirements
- Examination fees, scheduling, and application procedures
- Testing center procedures and administration
- Testing accommodations
- Examination regulations and testing center rules of conduct
- Examination privacy and security
- Examination irregularities and appeals

Through the Pearson VUE examination software link, candidates are able to download an online tutorial to become familiar with the examination software used to administer the NBDHE.

In addition, through the JCNDE website, candidates can purchase practice tests comprised of retired NBDHE items (JCNDE website). These practice tests are designed to assist candidates in identifying their strengths and weaknesses when preparing for the NBDHE and to familiarize them with the content and format of the examination.

> Finding 21: The directions and instructions provided to candidates appear straightforward. The information available to candidates is detailed and comprehensive.

Test Administration – Standardized Procedures and Testing Environment

Candidates are tested in similar testing centers, using the same equipment, under the same conditions. All candidates are assessed on the same examination content. In addition, all candidates are provided two note boards and two low-odor fine tip markers during the examination (NBDHE Candidate Guide, 2020).

> Finding 22: The procedures established for the test administration process and testing environment appear to be consistent with professional guidelines and technical standards.

CONCLUSIONS

Given the findings, the test administration protocols put in place by JCNDE appear consistent with professional guidelines and technical standards.

CHAPTER 6 | EXAMINATION SCORING AND PERFORMANCE

STANDARDS

The following standards are most relevant to scoring and performance for licensure examinations, as listed in the *Standards*.

> **Standard 2.3**
>
> For each total score, subscore, or combination of scores that is to be interpreted, estimates of relevant indices of reliability/precision should be reported (p. 43).
>
> **Standard 4.10**
>
> When a test developer evaluates the psychometric properties of items, the model used for that purpose (e.g., classical test theory, item response theory, or another model) should be documented. The sample used for estimating item properties should be described and should be of adequate size and diversity for the procedure. The process by which items are screened and the data used for screening, such as item difficulty, item discrimination, or differential item functioning (DIF) for major examinee groups, should also be documented. When model-based methods (e.g., IRT) are used to estimate item parameters in test development, the item response model, estimation procedures, and evidence of model fit should be documented (pp. 88-89).

FINDINGS

Examination Scoring

The NBDHE consists of multiple-choice items that are scored dichotomously (correct or incorrect). There is no penalty for selecting an incorrect response—a candidate's score is based on the number of correct responses (NBDHE Technical Report, 2020). In calculating a candidate's score, a raw score is first obtained by computing the number of items answered correctly (NBDHE Candidate Guide, 2020). The raw score is then statistically converted to a scale score, which can range from 49–99. A minimum score of 75 is required to pass the NBDHE.

As part of the validation process, candidate examination responses are routinely audited for accuracy before results are distributed. In addition, candidates can request to have their examination responses audited or rechecked for accuracy (NBDHE Technical Report, 2020).

Results for candidates who achieve a scaled score of 75 or higher are reported as "pass." Candidates who fail the examination receive information about their performance in each of the major disciplines assessed on the examination (NBDHE Candidate Guide, 2020). The discipline subscores are placed on a common measurement scale so that comparisons can be made and are presented graphically (NBDHE Technical Report, 2020). This allows candidates to identify areas of weakness and to compare scores across administration attempts.

Examination results are typically available 3–4 weeks after the examination date (NBDHE Candidate Guide, 2020). Candidates' pass/fail status is reported to the Board, and candidates can view their results by logging into their account on JCNDE's website. Candidates' pass/fail status may also be reported to accredited dental hygiene programs. In addition, accredited programs receive periodic reports that describe how their students perform on the examination relative to students from other programs.

> Finding 23: The scoring criteria is applied equitably, and the examination scoring process appears consistent with professional guidelines and technical standards.

Examination Performance

After administration of NBDHE forms, JCNDE performs item analyses and evaluates overall examination statistics. In addition, JCNDE also evaluates indices of examination consistency using a reference group comprising first-time test takers who attended accredited programs. These indices include: mean scaled score, scaled score standard deviation, mean score, and reliability range using KR20.

> Finding 24: The examination-level statistics indicate adequate performance for a licensure examination.

CONCLUSIONS

The steps taken by JCNDE to score the NBDHE appear to provide a fair and objective evaluation of candidate performance. The steps taken by JCNDE to evaluate examination performance also appear to be reasonable.

CHAPTER 7 | TEST SECURITY

STANDARDS

The following standards are most relevant to test security for licensure examinations, as referenced in the *Standards*.

> **Standard 6.6**
>
> Reasonable efforts should be made to ensure the integrity of test scores by eliminating opportunities for test takers to attain scores by fraudulent or deceptive means (p. 116).
>
> **Standard 6.7**
>
> Test users have the responsibility of protecting the security of test materials at all times (p. 117).

FINDINGS

Test Security – Examination Materials and Candidate Information

To ensure that the security of examination materials is maintained, JCNDE copyrights all examination items and materials to establish ownership and to restrict dissemination or unauthorized use (NBDHE Technical Report, 2020). In addition, JCNDE has developed policies and procedures for maintaining the custody of materials and conveying responsibility for examination security to examination developers, administrators, and users.

JCNDE screens all personnel who manage examination materials, including staff, vendors, and test constructor SMEs involved in examination development processes (NBDHE Technical Report, 2020). Staff are trained in procedures for handling secure materials and are required to comply with JCNDE policies regarding confidentiality and conflict of interest. In addition, test constructor SMEs involved in examination development processes must complete agreements regarding confidentiality, copyright assignment, and conflict of interest.

All computers used by JCNDE staff and by Pearson VUE for examination administration are protected with firewalls, login identifications, passwords, and other forms of security (NBDHE Technical Report, 2020). Access to electronic files is limited to authorized individuals. Access to facilities where NBDHE materials are stored is restricted, and electronic formats of examination materials are protected by firewalls, login identifications, passwords, and encryption.

> Finding 25: The security procedures practiced by JCNDE with regard to the maintenance of examination materials are consistent with professional guidelines and technical standards.

Test Security – Test Sites

JCNDE contracts with Pearson VUE for administration of the NBDHE, and Pearson VUE staff are trained in procedures for maintaining security of examination materials at test facilities (NBDHE Technical Report, 2020). In addition, JCNDE reviews Pearson VUE's operations to ensure compliance with security policy and procedures.

At test sites, candidates are required to provide current and valid government-issued identification to sit for the examination (NBDHE Candidate Guide, 2020). In addition, Pearson VUE staff uses biometric technology to capture each candidate's identity.

The 2020 NBDHE Candidate Guide lists items that candidates are prohibited from bringing into secure testing areas (NBDHE Candidate Guide, 2020). Prohibited items include, but are not limited to, outside books or reference materials, electronic devices, and accessories. In addition, the 2020 NBDHE Candidate Guide describes the examination rules of conduct and prohibited behaviors, including examination subversion or falsification of information.

During candidate check-in, Pearson VUE staff perform visual inspections to check for recording devices or other prohibited items. Pearson VUE staff may also use a wand to detect electronic devices.

All testing sessions for the NBDHE are monitored by staff at the test center. Proctors at Pearson VUE testing centers are trained to recognize potential test security breaches. In addition, testing sessions at Pearson VUE sites are video recorded.

> Finding 26: The security procedures practiced by JCNDE regarding test sites are consistent with professional guidelines and technical standards.

CONCLUSIONS

Given the findings, the test center security procedures at Pearson VUE appear to meet professional guidelines and technical standards.

CHAPTER 8 | COMPARISON OF THE NBDHE BLUEPRINT WITH THE CALIFORNIA DESCRIPTION OF PRACTICE OUTLINE

PARTICIPATION OF SUBJECT MATTER EXPERTS

OPES convened a two-day workshop on May 14–15, 2020 to evaluate the NBDHE test specifications resulting from the 2016 JCNDE OA and to compare them with the California registered dental hygienist description of practice based on the OPES 2019 California OA of the Registered Dental Hygienist Profession (California RDH OA, 2019).

OPES recruited seven SMEs to participate in the workshop. The SMEs represented the profession in terms of geographical location in California. Two of the SMEs had been licensed for 1–5 years, one had been licensed for 6–10 years, three had been licensed for 11–19 years, and one had been licensed for more than 20 years. All SMEs worked as dental hygienists in various settings.

WORKSHOP PROCESS

First, the SMEs completed OPES' security agreement, self-certification, secure area agreement, and personal data (demographic) forms. The OPES facilitator explained the importance of, and the guidelines for, security during and outside the workshop.

Next, the OPES facilitator gave a PowerPoint presentation about the purpose and importance of OA, validity, content validity, reliability, test administration standards, examination security, and the role of SMEs. The OPES facilitator also explained the purpose of the workshop.

The SMEs were instructed to evaluate and link each task and knowledge statement of the California description of practice to the disciplines and subdisciplines included on the NBDHE test specifications. The SMEs worked as a group to evaluate and link all of the task and knowledge statements of the California description of practice.

The main disciplines and subdisciplines of the NBDHE are provided in Table 1. Table 2 provides the content areas of the 2019 California description of practice.

TABLE 1 – COMPONENTS AND DISCIPLINES OF THE NBDHE BLUEPRINT

COMPONENT	WEIGHT
A. Discipline-Based Component	**57%**
1. Scientific Basis for Dental Hygiene Practice	17%
2. Provision of Clinical Dental Hygiene Services	33%
3. Community Health/Research Principles	7%
B. Case-Based Items	**43%**

TABLE 2 – CONTENT AREAS OF THE 2019 CALIFORNIA REGISTERED DENTAL HYGIENIST DESCRIPTION OF PRACTICE

Content Area	Content Area Description	Percent Weight
1. Treatment Preparation	This area assesses the candidate's knowledge of preparing the operatory and patient dental hygiene services.	5%
2. Dental Hygiene Treatment	This area assesses the candidate's knowledge of completing a comprehensive oral health assessment, dental hygiene treatment planning, and dental hygiene treatment.	40%
3. Patient Education	This area assesses the candidate's knowledge of educating patients regarding oral health and individualized oral hygiene instructions.	10%
4. Infection Control	This area assesses the candidate's knowledge of maintaining a safe and clean work environment and adhering to infection control protocols and standard precautions.	15%
5. Documentation	This area assesses the candidate's knowledge of documenting patient oral health status, procedures performed, and updating patient dental records.	5%
6. Laws, Regulations, and Ethics	This area assesses the candidate's knowledge of licensing requirements, professional conduct, patient confidentiality, use of telehealth methods and technology, and mandated reporting.	25%
Total		**100%**

FINDINGS

The SMEs compared the task and knowledge statements of the 2019 California description of practice outline and the NBDHE test specifications. The SMEs concluded that the NBDHE adequately assessed the knowledge required for entry-level dental hygiene practice in California in the following areas:

- Treatment preparation
- Dental hygiene treatment
- Patient education
- Infection control
- Documentation

The SMEs indicated that the NBDHE did not adequately assess the content area Laws, Regulations, and Ethics. However, this content is measured by the California-specific Registered Dental Hygienist Law and Ethics Examination.

Finding 27: The SMEs concluded that the content of the NBDHE adequately assesses the knowledge required for entry-level dental hygiene practice in California.

Finding 28: The SMEs concluded that the content of the NBDHE does not adequately assess the knowledge of laws and ethics required for practice in California. SMEs concluded that this content should continue to be measured using a California-specific law and ethics examination.

CONCLUSIONS

Given the findings, the content of the NBDHE sufficiently assesses the knowledge necessary for competent dental hygiene practice at the time of licensure in California.

CHAPTER 9 | CONCLUSIONS

COMPREHENSIVE REVIEW OF THE JCNDE NBDHE PROGRAM

OPES completed a comprehensive analysis and evaluation of the documents provided by JCNDE.

OPES finds that the procedures used to establish and support the validity and defensibility of the NBDHE (i.e., OA, examination development, passing scores and passing rates, test administration, examination scoring and performance, and test security procedures) meet professional guidelines and technical standards as outlined in the *Standards* and in California B&P Code § 139.

However, OPES finds that the service of board members and educators in examination development processes is not fully compliant with OPES 20-01, as mandated by B&P Code § 139. OPES recommends phasing out the service of board members and educators as SMEs.

Given the findings regarding the NBDHE, OPES supports the Dental Hygiene Board of California's continued use of the NBDHE for licensure in California as part of its licensure examination program.

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Board of California

REVIEW OF THE CENTRAL REGIONAL DENTAL TESTING SERVICE (CRDTS) DENTAL HYGIENE EXAMINATION

STATE OF CALIFORNIA
dca
DEPARTMENT OF CONSUMER AFFAIRS

DENTAL HYGIENE BOARD OF CALIFORNIA

REVIEW OF THE CENTRAL REGIONAL DENTAL TESTING SERVICE (CRDTS) DENTAL HYGIENE EXAMINATION

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STATE OF CALIFORNIA
DEPARTMENT OF CONSUMER AFFAIRS
OFFICE OF PROFESSIONAL EXAMINATION SERVICES

This report is mandated by California Business and Professions (B&P) Code § 139 and by DCA Licensure Examination Validation Policy OPES 18-02.

EXECUTIVE SUMMARY

Licensing boards and bureaus within the California Department of Consumer Affairs (DCA) are required to ensure that examination programs used in the California licensure process comply with psychometric and legal standards. The Dental Hygiene Board of California (Board) requested that DCA's Office of Professional Examination Services (OPES) complete a comprehensive review of the Central Regional Dental Testing Services (CRDTS) patient-based Dental Hygiene Examination. The purpose of the OPES review was to evaluate the suitability of the patient-based CRDTS Dental Hygiene Examination for continued use in California licensure.

To become licensed as a registered dental hygienist in California, the Board requires candidates to have requisite education and experience and to pass three examinations:

1. The National Board Dental Hygiene Examination (NBDHE)
2. The Western Regional Examining Board (WREB) Dental Hygiene Examination or the CRDTS Dental Hygiene Examination
3. The California Registered Dental Hygienist Law and Ethics Examination

The CRDTS Dental Hygiene Examination is a patient-based clinical examination that measures skills in four areas:

1. Extra/intra Oral Assessment
2. Periodontal Probing
3. Scaling/Subgingival Calculus Removal
4. Supragingival Deposit Removal

In 2017, CRDTS collaborated with WREB to conduct an occupational analysis (OA) for the dental hygienist profession and to update the examination blueprint for the patient-based CRDTS Dental Hygiene Examination.

OPES, in collaboration with the Board and CRDTS, received and reviewed the results of the 2017 OA, as well as other documents provided by CRDTS. OPES performed a comprehensive evaluation of the documents to determine whether the following test program components met professional guidelines and technical standards: (a) OA, (b) examination development, (c) passing scores and passing rates, (d) test registration and administration, (e) examination scoring and performance, and (f) test security procedures. Follow-up emails were exchanged to clarify the procedures and practices used to validate and develop the patient-based CRDTS Dental Hygiene Examination.

OPES found that the procedures used to develop and administer the patient-based CRDTS Dental Hygiene Examination are *generally* consistent with professional guidelines and technical standards outlined in the *Standards for Educational and Psychological Testing* (2014) *(Standards)* and California Business and Professions (B&P) Code § 139. However, OPES made recommendations for CRDTS to consider, particularly regarding standardization, scoring, and documentation of the passing score process.

In addition to reviewing documents provided by CRDTS, OPES convened a workshop of licensed California registered dental hygienists to serve as subject matter experts (SMEs) to review the content of the patient-based CRDTS Dental Hygiene Examination. The SMEs were selected by the Board to represent the profession in terms of geographic location, experience, and specialty. The purpose of the review workshop was to compare the content of the patient-based CRDTS Dental Hygiene Examination with the California registered dental hygienist description of practice that resulted from the 2019 California Occupational Analysis of the Registered Dental Hygienist Profession (California RDH OA, 2019) performed by OPES. During this workshop, the SMEs compared the task and knowledge statements from the California description of practice to the examination content of the patient-based CRDTS Dental Hygiene Examination. A linkage study was performed to identify whether there were areas of California dental hygiene practice that are not measured by the CRDTS Dental Hygiene Examination.

The results of the linkage study indicated that skills associated with four of the six areas included in the California dental hygiene description of practice were adequately linked to the content of the patient-based CRDTS Dental Hygiene Examination. SMEs concluded that one of the content areas, Patient Education, was not adequately assessed by the CRDTS Dental Hygiene Examination. However, SMEs determined that this content area is assessed by other examinations. In addition, the SMEs indicated that the content area Laws, Regulations, and Ethics was not adequately assessed by the content of the patient-based CRDTS Dental Hygiene Examination and should continue to be measured by the California-specific law and ethics examination.

In its evaluation, OPES found that while the patient-based CRDTS Dental Hygiene Examination was *generally* consistent with technical standards regarding validity, there are standardization challenges associated with the use of live patients. OPES further found a consistently high passing rate on the patient-based CRDTS Dental Hygiene Examination. This may indicate that candidates receive sufficient training in their pre-licensure clinical examinations to prepare them for safe and effective dental hygiene practice. Given these findings, OPES recommends that the Board consider conducting an evaluation to determine whether a skills-based examination is necessary for assessing a candidate's competence for practice, or whether a knowledge-based examination may be sufficient to assess minimum competence for licensure.

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CHAPTER 1 | INTRODUCTION

PURPOSE OF THE COMPREHENSIVE REVIEW

Licensing boards and bureaus within the California Department of Consumer Affairs (DCA) are required to ensure that examination programs used in the California licensure process comply with psychometric and legal standards. The public must be reasonably confident that an individual passing a licensure examination has the requisite knowledge and skills to competently and safely practice in the profession.

The Dental Hygiene Board of California (Board) requested that DCA's Office of Professional Examination Services (OPES) complete a comprehensive review of the Central Regional Dental Testing Service (CRDTS) patient-based Dental Hygiene Examination. The CRDTS Dental Hygiene Examination is a patient-based clinical examination that measures a candidate's competence in performing the skills required for dental hygiene practice in four areas:

1. Extra/intra Oral Assessment
2. Periodontal Probing
3. Scaling/Subgingival Calculus Removal
4. Supragingival Deposit Removal

Assessment also incorporates evaluation of a candidate's ability to prevent tissue trauma during prophylaxis procedures.

OPES' review of the patient-based CRDTS Dental Hygiene Examination had three purposes:

1. To evaluate the suitability of the patient-based CRDTS Dental Hygiene Examination for use in California.

2. To determine whether the patient-based CRDTS Dental Hygiene Examination meets the professional guidelines and technical standards outlined in the *Standards for Educational and Psychological Testing* (2014) (*Standards*)[1] and California Business and Professions (B&P) Code §139.

3. To identify any areas of California dental hygiene practice that the patient-based CRDTS Dental Hygiene Examination does not assess.

[1] See Chapter 10 for the complete reference to the *Standards.*

In relation to the *Standards*, evaluating the acceptability of an examination does not involve determining whether the examination satisfies each individual standard interpreted literally. The importance of each standard varies according to circumstances. Page 7 of the *Standards* states:

> Individual standards should not be considered in isolation. Therefore, evaluating acceptability depends on (a) professional judgment that is based on a knowledge of behavioral science, psychometrics, and the relevant standards in the professional field to which the test applies; (b) the degree to which the intent of the standard has been satisfied by the test developer and user; (c) the alternative measurement devices that are readily available; (d) research and experiential evidence regarding the feasibility of meeting the standard; and (e) applicable laws and regulations.

OPES, in collaboration with the Board, requested documentation from CRDTS to determine whether the following CRDTS Dental Hygiene Examination program components met professional guidelines and technical standards outlined in the *Standards* and B&P Code § 139: (a) occupational analysis (OA),[2] (b) examination development, (c) passing scores and passing rates,[3] (d) test registration and administration, (e) examination scoring and performance, and (f) test security procedures.

CALIFORNIA LAW AND POLICY

Section 139 (a) of the California B&P Code states:

> The Legislature finds and declares that occupational analyses and examination validation studies are fundamental components of licensure programs.

It further requires that DCA develop a policy to address the minimum requirements for psychometrically sound examination validation, examination development, and occupational analyses, including standards for the review of state and national examinations.

DCA Licensure Examination Validation Policy OPES 18-02 (OPES 18-02) specifies the *Standards* as the most relevant technical and professional standards to be followed to ensure that examinations used for licensure in California are psychometrically sound, job-related, and legally defensible.

FORMAT OF THE REPORT

The chapters of this report provide the relevant standards related to psychometric aspects of the patient-based CRDTS Dental Hygiene Examination and describe the findings and recommendations that OPES identified during its review.

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[2] An occupational analysis is also known as a job analysis, practice analysis, or task analysis.
[3] A passing score is also known as a pass point or cut score.

CHAPTER 2 | OCCUPATIONAL ANALYSIS

STANDARDS

The following standard is most relevant to conducting OAs for licensure examinations, as referenced in the *Standards.*

Standard 11.13

> The content domain to be covered by a credentialing test should be defined clearly and justified in terms of the importance of the content for credential-worthy performance in an occupation or profession. A rationale and evidence should be provided to support the claim that the knowledge or skills being assessed are required for credential-worthy performance in that occupation and are consistent with the purpose for which the credentialing program was instituted (pp. 181-182).

The comment following Standard 11.13 emphasizes its relevance:

> *Comment:* Typically, some form of job or practice analysis provides the primary basis for defining the content domain. If the same examination is used in the credentialing of people employed in a variety of settings and specialties, a number of different job settings may need to be analyzed. Although the job analysis techniques may be similar to those used in employment testing, the emphasis for credentialing is limited appropriately to knowledge and skills necessary for effective practice...
>
> In tests used for licensure, knowledge and skills that may be important to success but are not directly related to the purpose of licensure (e.g., protecting the public) should not be included (p. 182).

California B&P Code § 139 requires that each California licensing board, bureau, commission, and program report annually on the frequency of its OAs and the validation and development of its examinations. OPES 18-02 states:

> Generally, an occupational analysis and examination outline should be updated every five years to be considered current; however, many factors are taken into consideration when determining the need for a different interval. For instance, an occupational analysis and examination outline must be updated whenever there are significant changes in a profession's job tasks and/or demands, scope of practice, equipment, technology, required knowledge, skills and abilities, or laws and regulations governing the profession (p. 4).

FINDINGS

In 2017, CRDTS collaborated with the Western Regional Examining Board (WREB) to conduct an OA for the dental hygiene profession. This OA was conducted at the national level. Results of this OA were documented for a presentation at a CRDTS and WREB Joint Dental Hygiene Practice Analysis Meeting in 2018 (CRDTS and WREB Joint Meeting, 2018), and in the WREB 2017–18 Dental Hygiene Practice Analysis: Report of Findings Prepared for the CRDTS and WREB Joint Dental Hygiene Practice Analysis Committee (WREB Practice Analysis Report, 2020).

Occupational Analysis – Methodology and Time Frame

The purpose of the OA was to provide evidence to state licensing boards in support of decisions regarding candidate readiness for professional practice, to draw reliable inferences regarding minimal competence from candidate performance, and to determine the appropriate content to assess performance levels and set passing standards (CRDTS and WREB Joint Meeting, 2018). The methodology used to conduct the OA was an online survey that described the practices (job tasks) performed by dental hygienists.

The survey was developed by CRDTS and WREB and was designed to be comparable to surveys administered by both testing agencies in prior OAs. A Joint Dental Hygiene Practice Analysis Committee (Practice Analysis Committee) was also involved in the development process. The Practice Analysis Committee comprised six subject matter experts (SMEs), who were selected from WREB and CRDTS member states. All SMEs had a minimum of 20 years of experience in the dental hygiene profession and were experienced board examiners or dental hygiene educators (WREB Practice Analysis Report, 2020).

The online survey was then completed by dental hygienists who were members of the American Dental Hygienists' Association (ADHA).

> Finding 1: The most recent OA was completed in 2017. The OA was conducted within a time frame considered to be current and legally defensible.
>
> Finding 2: The previous OA conducted by CRDTS occurred in 2012. The interval between the previous OA and the start of the current one complies with DCA policy established under B&P Code § 139, which specifies that an OA should be conducted every 5 years.

Occupational Analysis – Development of Survey Instrument

In 2017, CRDTS and WREB collaboratively developed a survey to perform an OA of dental hygiene practice. The survey was developed by evaluating the major content domains and practices (tasks) listed on previous surveys administered by both organizations. Similar practice statements were combined, and additional restorative and anesthesia practices were added (WREB email communication, June 2020). Three WREB SMEs from the Practice Analysis Committee reviewed the practice (task) statements and the final survey. CRDTS SMEs on the Practice Analysis Committee also reviewed the statements and survey (WREB email communication, June 2020).

The final survey included three sections. The first section comprised eight demographic questions designed to gather information about the survey respondents and their practice setting. This section also included questions specifically for respondents who practiced in a clinical setting. The section asked them how frequently they performed adult prophylaxis procedures, non-surgical periodontal procedures, and periodontal maintenance procedures. The second section of the survey comprised 49 practices (tasks) that were distributed across three content areas related to dental hygiene practice. Respondents were asked to rate each practice (task) on two rating scales: importance to practice (very important, somewhat important, or less important) and frequency of performance of the task (routinely, occasionally, or rarely). The third section of the survey asked respondents to provide comments or suggestions (WREB Practice Analysis Report, 2020).

> Finding 3: The procedure used by CRDTS to develop the survey instrument generally complies with professional guidelines and technical standards.
>
> Finding 4: The development of the survey involved six SMEs, all of whom were licensed more than 20 years. To better represent the profession in terms of entry level practice, practice setting, and geographical location, more than six SMEs should be involved in the survey development process.

Occupational Analysis – Sampling Plan

The sampling plan for the study involved sending invitation emails to all of the 14,418 members of the ADHA in October 2017 (WREB Practice Analysis Report, 2020).

Of the 14,418 members, 27% of the respondents completed the survey with enough detail to provide valid data. Of the 3,901 usable respondents, 27% were from the western region of the United States, with 228 (5.8%) from California.

> Finding 5: The intent of the sampling plan and the overall response rate were acceptable. The number of survey respondents from California was sufficient to ensure representation of licensed California registered dental hygienists.

Occupational Analysis – Survey Results

After administering the survey, CRDTS and WREB collected the data and analyzed the survey results. Analyses included descriptive statistics calculated for each dental hygiene practice (task) included on the survey. Ratings on frequency and importance scales were combined using a multiplicative model that resulted in a potential range of 1 to 9. The frequency-importance product values were rank-ordered and presented to the Practice Analysis Committee for review.

Analyses also included correlation and linear regression to compare results for dental hygiene practices (tasks) with the results obtained on previous OA surveys. Overall, frequency-importance values for practices (tasks) included on the current OA had a correlation of .94 with those included on a previous OA conducted by CRDTS in 2012 (WREB Practice Analysis Report, 2020).

> Finding 6: The respondents comprised dental hygienists throughout the United States. Of the respondents, 48.4% had been practicing for 20 years or longer, 22.1% had been practicing for 10–20 years, 10% had been practicing for 5–10 years, and 18.6% had been practicing for less than 5 years. Approximately 51% of respondents were from CRDTS and WREB member states, while 49% were from other states.
>
> A majority of respondents indicated practicing in a private setting (75.6%), while 19.5% indicated that they worked in an educational setting. Fewer than 10% of respondents gave their practice setting as either a public health agency, corporate dental office, hospital/care facility, or the military.
>
> Four questions on the survey were directed toward dental hygienists who were actively practicing in a clinical setting. These questions pertained to the frequency of adult prophylaxis, non-surgical periodontal procedures, and periodontal maintenance procedures performed. All other practices (tasks) were rated by all survey respondents.

Occupational Analysis – Decision Rules and Final Examination Blueprint

The results of the survey were reviewed by the Practice Analysis Committee in April 2018. The Practice Analysis Committee SMEs discussed the results of the survey in conjunction with CRDTS' current examination blueprint. SMEs evaluated whether there were any prominent shifts in practice and whether any changes were required on the current CRDTS Dental Hygiene Examination (WREB Practice Analysis Report, 2020).

The Practice Analysis Committee SMEs indicated that there were no major shifts in the practices (tasks) performed by dental hygienists. The SMEs further determined that the practices (tasks) of intraoral examination, periodontal assessment, gingival recession assessment, and non-surgical periodontal treatments continue to be important and should remain the major components of the patient-based CRDTS Dental Hygiene Examination (WREB Practice Analysis Report, 2020).

Finding 7: The linkage between the practices (tasks) required for entry-level dental hygienists and the major content areas of the CRDTS Dental Hygiene Examination demonstrates a sufficient level of validity, thereby meeting professional guidelines and technical standards.

RECOMMENDATIONS

Recommendation 1: Results of OAs are used to develop licensure examinations that measure the competencies required for practice. To ensure that examination content accurately reflects these competencies, survey responses should be obtained from licensed dental hygienists who are currently practicing. With the exception of responses to four questions, it appears that ratings of practices on the OA survey included responses from licensees who may not have been actively providing clinical services. OPES recommends that future OAs exclude responses obtained from dental hygienists who are retired or otherwise not currently engaged in dental hygiene practice.

Recommendation 2: Licensure examinations should measure the competencies required at initial licensure, and not those gained over time. As such, examination content should be based on the results of an OA that includes a representative sample of entry-level practitioners. Entry-level is generally defined as a practitioner licensed 5 years or less. OPES recognizes the sampling limitations involved in conducting an OA of this scope and commends the efforts made by CRDTS and WREB to sample from this demographic. However, OPES recommends that future OAs attempt to increase the participation of practitioners licensed less than 5 years to ensure adequate representation of entry-level perspectives.

CONCLUSIONS

The OA conducted by CRDTS in conjunction with WREB appears to be reasonably consistent with professional guidelines and technical standards. Additionally, the examination blueprint for the patient-based CRDTS Dental Hygiene Examination appears to be based on the results of the OA, which is consistent with professional guidelines and technical standards.

CHAPTER 3 | EXAMINATION DEVELOPMENT

STANDARDS

Examination development includes many steps within an examination program, from the development of an examination outline to scoring and analyzing items after the administration of an examination. Several specific activities involved in the examination development process are evaluated in this section. The activities include development of examination content, linkage of examination content to the examination outline, and developing scoring criteria.

The following standards are most relevant to examination development for licensure examinations, as referenced in the *Standards.*

Standard 4.7

The procedures used to develop, review, and try out items and to select items from the item pool should be documented (p. 87).

Standard 4.12

Test developers should document the extent to which the content domain of a test represents the domain defined in the test specifications (p. 89).

The following regulations are relevant to the integrity of the examination development process:

California B&P Code § 139 requires the Department of Consumer Affairs to develop a policy on examination validation which includes minimum requirements for psychometrically sound examination development.

DCA Policy Participation in Examination Development Workshops OPES 20-01 (OPES 20-01), as mandated by B&P Code § 139, specifies that board members, committee members, and instructors should not serve as expert consultants in the licensure examination development process. This is due to potential conflict of interest, undue influence, and security considerations.

FINDINGS

Examination Development – Subject Matter Experts

In 1978, CRDTS adopted an examination model for the patient-based Dental Hygiene Examination. The examination model resulted from a large-scale national study that involved 22 field studies conducted by the ADHA, according to the CRDTS' National Dental Examination Report for the Year Ending 2017 (CRDTS Technical Report, 2017).

Following adoption of the 1978 model, CRDTS performed additional calibration and statistical analyses. In 2004, CRDTS worked in conjunction with the American Board of Dental Examiners

(ADEX) to develop a national dental hygiene clinical examination representative of all regional testing agencies. The results of this development project formed the basis of the CRDTS Dental Hygiene Examination.

In 2009, CRDTS discontinued its association with ADEX, but maintained the design and structure of the original patient-based CRDTS Dental Hygiene Examination (CRDTS Technical Report, 2017). Since 2009, CRDTS has maintained responsibility for refining the patient-based Dental Hygiene Examination based on the most current OA and statistical data.

The content of the patient-based CRDTS Dental Hygiene Examination undergoes periodic review and revision by the CRDTS Dental Hygiene Examination Review Committee (ERC), according to the CRDTS 2020 Dental Hygiene Candidate Manual (CRDTS Candidate Manual, 2020, p. 4). The ERC comprises representatives from CRDTS member states, dental hygiene educators, and special consultants. The ERC reviews the results of practice surveys, current curricula, and standards of competency to ensure that the content and protocol of the patient-based CRDTS Dental Hygiene Examination remains current and relevant to practice.

> Finding 8: The procedures used to develop and review the content of the patient-based CRDTS Dental Hygiene Examination appear relatively consistent with professional guidelines and technical standards. However, the use of board members and educators in the examination development process is not fully compliant with OPES 20-01, as mandated by B&P Code § 139.

Examination Development – Linkage to Examination Blueprint

In 2018, the Practice Analysis Committee met to verify the linkage between the results of the OA and the content domains of the patient-based CRDTS Dental Hygiene Examination blueprint (examination specifications). The ERC also reviewed the results of the OA and confirmed that the content domains specified in the patient-based CRDTS Dental Hygiene Examination blueprint are accurate (CRDTS telephone communication, December 2020).

> Finding 9: The methods used to establish the linkage between examination content and the competencies necessary for practice appear consistent with professional guidelines and technical standards.

Examination Development – Item Field Testing

The patient-based CRDTS Dental Hygiene Examination is a clinical examination that measures a candidate's ability to competently perform in four main content domains of dental hygiene practice. The items included in the content domains are the product of years of field testing and refinement (CRDTS Technical Report, 2017). In addition, CRDTS performs ongoing reviews of item performance in frequent ERC meetings.

> Finding 10: The procedures used to develop, review, and field test items comprising the patient-based CRDTS Dental Hygiene Examination appear consistent with professional guidelines and technical standards.

Examination Development – Examination Forms

The content domains included in the patient-based CRDTS Dental Hygiene Examination remain consistent across examination administrations. Items included on the examination are differentially weighted according to subtest (content areas). The subtest Extra-intra Oral Assessment consists of 8 items (2 points each); Periodontal Probing consists of 12 items (1 point each); Scaling/subgingival Calculus Removal consists of 12 items (5 points each); and Supragingival Deposit Removal consists of 6 items (2 points each) (CRDTS Candidate Manual, 2020). The subtests (content areas) and assessed items are linked to the existing examination blueprint, which resulted from the 2017 OA.

The CRDTS Dental Hygiene Examination undergoes frequent review by the ERC (CRDTS telephone conversation, May 2020). The ERC reviews analyses of candidate performance and technical information about examiner agreement. Based on these analyses, ERC makes recommendations for adjustment or refinement to examination content, administration procedures, or scoring.

> Finding 11: The procedures used to develop and refine examination content included on the patient-based CRDTS Dental Hygiene Examination are generally consistent with professional guidelines and technical standards. However, the use of board members and educators is not compliant with OPES 20-01, as mandated by B&P Code § 139.

RECOMMENDATIONS

> Recommendation 3: OPES recognizes that CRDTS requires the participation of practitioners from member states to develop and administer examinations. In order to be fully compliant with OPES 20-01, OPES recommends phasing out or limiting the service of board members and educators during examination development processes.

CONCLUSIONS

Given the findings, the examination development activities conducted by CRDTS appear to be generally consistent with professional guidelines and technical standards with regard to development of examination content, to the linkage of examination content to the examination blueprint, and to the testing and review of examination performance. To reduce the potential for conflict of interest, OPES recommends phasing out the use of board members and educators as SMEs.

CHAPTER 4 | PASSING SCORES AND PASSING RATES

STANDARDS

The passing score of an examination is the score that represents the level of performance that divides those candidates for licensure who are minimally competent from those who are not competent.

The following standards are most relevant to passing scores, cut points, or cut scores for licensure examinations, as referenced in the *Standards.*

> **Standard 5.21**
>
> When proposed score interpretations involve one or more cut scores, the rationale and procedures used for establishing cut scores should be documented clearly (p. 107).
>
> **Standard 11.16**
>
> The level of performance required for passing a credentialing test should depend on the knowledge and skills necessary for credential-worthy performance in the occupation or profession and should not be adjusted to control the number or proportion of persons passing the test (p. 182).

The supporting commentary on passing or cut scores for Chapter 5 of the *Standards*, "Scores, Scales, Norms, Score Linking, and Cut Scores," states that the standard-setting process used should be clearly documented and defensible. The qualifications of the judges involved and the process of selecting them should be part of the documentation. A sufficiently large and representative group of judges should be involved, and care must be taken to ensure that judges understand the process and procedures they are to follow (p. 101).

In addition, the supporting commentary for Chapter 11 of the *Standards*, "Workplace Testing and Credentialing," states that the focus of tests used in credentialing is on "the standards of competence needed for effective performance (e.g., in licensure this refers to safe and effective performance in practice)" (p. 175). It further states, "Standards must be high enough to ensure that the public, employers, and government agencies are well served, but not so high as to be unreasonably limiting" (p. 176).

FINDINGS

Passing Scores – The CRDTS Dental Hygiene Examination: Process, Use of Subject Matter Experts, and Methodology

The passing score for the patient-based CRDTS Dental Hygiene Examination is set at 75 out of 100 possible points. CRDTS adopted this passing score to establish uniformity with states that have a passing score set in regulation and to align with the cut score used by the Joint Commission on National Dental Examinations (CRDTS Technical Report, 2017).

CRDTS is a testing agency, and the final decision regarding passing scores is up to the individual state licensing agency. California has adopted the CRDTS-recommended passing score of 75 for the patient-based CRDTS Dental Hygiene Examination.

> Finding 12: It is unclear whether the methods used to set the passing score for the patient-based CRDTS Dental Hygiene Examination meet professional guidelines and technical standards. The CRDTS Technical Report (2017) references a test development project (CORE) that was conducted in conjunction with the Northeast Regional Board in 1993. This project sought to establish a uniform cut score that would be "acceptable in any state" (CRDTS Technical Report, 2017, p. 25). As a result of this project, CRDTS reweighted its rating scale. Additionally, this report indicates that in the fall of 2003, CRDTS changed the passing score for the Dental Hygiene Examination from 70 to 75. However, no information was provided regarding the 1993 study, the processes used to establish the passing score, or how the passing score relates to current standards of minimum competence for safe practice.

Passing Rates

CRDTS tracks passing rates for individual educational programs within each state and provides annual reports to licensing agencies and each dental hygiene school (CRDTS Technical Report, 2017). These reports provide information regarding candidate mean scores and overall pass rates by educational institution, as well as candidate mean scores on each of the four major subtests (content areas) included on the patient-based CRDTS Dental Hygiene Examination. Data for educational institutions with fewer than four candidates are excluded from analyses.

OPES requested reports of pass rates for the past five years. However, the patient-based CRDTS Dental Hygiene Examination was discontinued in early 2020 due to the COVID-19 pandemic, and data were not provided for candidates who took the examination in 2020. Therefore, results analyzed for this report are based solely on data for the years 2015–2019.

> Finding 13: For the years 2015–2019, passing rates for California candidates across educational institutions were consistently high. The number of candidates who took the examination each year ranged from 191–226. The number of educational institutions included in the analyses ranged from 10–13. Overall pass rates for the majority of educational institutions tended to be above 90%, with many demonstrating a pass rate of 100%. In each of the years evaluated, there were two educational institutions with pass

rates below 90%. These institutions varied across years; however, data indicated that candidates at these institutions tended to incur penalties related to treatment selection and patient rejection, which likely had a significant impact on mean scores.

Statistics regarding candidate performance on individual sections of the examination indicated that California candidates tended to perform well on all subtests (content areas). In all of the years analyzed, candidate mean scores for the majority of educational institutions were typically within one point of the maximum possible points on the subtests (content areas) Extra/intra Oral Assessment, Periodontal Probing, and Supragingival Deposit Removal. The content area Scaling/Subgingival Calculus Removal produced the greatest variability in candidate mean scores; however, this variability may reflect treatment selection penalties and variance associated with case complexity.

CRDTS states that the high passing rates are to be expected given the high level of training candidates receive before taking the patient-based CRDTS Dental Hygiene Examination (CRDTS Technical Report, 2017).

Finding 14: Reports provided by CRDTS exclude data for educational institutions where fewer than four candidates took the examination. As a result, complete and accurate data for California candidates is not readily available. In addition, the data presented does not allow evaluation of the impact of penalties on candidate scores.

RECOMMENDATIONS

Recommendation 4: OPES recognizes that many CRDTS member states may legislate an absolute passing standard, which is commonly set at 75%. However, OPES has advised that California boards avoid using absolute passing scores for licensure examinations and instead use a criterion-referenced passing score methodology that reflects the competencies required for practice. Many regional or national examination programs use a scaled scoring process based on minimum competence to meet this requirement. It is possible that the methodology used by CRDTS to establish its passing score complies with professional standards and guidelines; however, it is unclear from the documentation provided.

Further, the documentation provided references projects and passing score changes that occurred in 1993 and 2003. OPES recommends that CRDTS clearly document the processes used to establish the passing score for the patient-based Dental Hygiene Examination and how the passing score relates to minimum competence standards. Further, this documentation should describe the role of SMEs in providing professional judgements and should specify ongoing steps taken to ensure that the passing score reflects *current* competency standards.

Recommendation 5: Reports provided by CRDTS allow its member states to evaluate candidate performance by educational institution. Data for educational institutions with fewer than four candidates is not reported. As a result, it is difficult to fully evaluate the performance of California candidates on the examination. OPES recommends that CRDTS provide information in reports regarding the performance of all California candidates. Further, reports do not provide information regarding the number of penalties assessed except for the penalties associated with treatment selection and tissue trauma. OPES recommends that CRDTS include this information in its reports to allow for a full assessment of how California candidates perform on the examination.

CONCLUSIONS

Given the findings, the process of establishing passing scores fails to demonstrate a robust methodology. It is unclear whether the methodologies used by CRDTS in setting the passing score for the patient-based CRDTS Dental Hygiene Examination demonstrate a sufficient degree of validity to meet professional guidelines and technical standards.

Given the findings, the passing rates for the CRDTS Dental Hygiene Examination indicate that California candidates perform exceptionally well. If the passing score appropriately reflects minimum competence, the high passing rates may indicate that California candidates are receiving adequate training in education programs to prepare them for demonstrating minimum competence for practice.

CHAPTER 5 | TEST REGISTRATION AND ADMINISTRATION

STANDARDS

The following standards are most relevant to standardizing the test administration process for licensing examinations, as referenced in the *Standards.*

Standard 3.4

Test takers should receive comparable treatment during the test administration and scoring process (p. 65).

Standard 4.15

The directions for test administration should be presented with sufficient clarity so that it is possible for others to replicate the administration conditions under which the data on reliability, validity, and (where appropriate) norms were obtained. Allowable variations in administration procedures should be clearly described. The process for reviewing requests for additional testing variations should also be documented (p. 90).

Standard 4.16

The instructions presented to test takers should contain sufficient detail so that test takers can respond to a task in the manner that the test developer intended. When appropriate, sample materials, practice or sample questions, criteria for scoring, and a representative item identified with each item format or major area in the test's classification or domain should be provided to the test takers prior to the administration of the test or should be included in the testing material as part of the standard administration instructions (p. 90).

Standard 6.1

Test administrators should follow carefully the standardized procedures for administration and scoring specified by the test developer and any instructions from the test user (p. 114).

Standard 6.2

When formal procedures have been established for requesting and receiving accommodations, test takers should be informed of these procedures in advance of testing (p. 115).

Standard 6.3

Changes or disruptions to standardized test administration procedures or scoring should be documented and reported to the test user (p. 115).

Standard 6.4

The testing environment should furnish reasonable comfort with minimal distractions to avoid construct-irrelevant variance (p. 116).

Standard 6.5

Test takers should be provided appropriate instructions, practice, and other support necessary to reduce construct-irrelevant variance (p. 116).

Standard 8.1

Information about test content and purposes that is available to any test taker prior to testing should be available to all test takers. Shared information should be available free of charge and in accessible formats (p. 133).

Standard 8.2

Test takers should be provided in advance with as much information about the test, the testing process, the intended test use, test scoring criteria, testing policy, availability of accommodations, and confidentiality protection as is consistent with obtaining valid responses and making appropriate interpretations of test scores (p. 134).

FINDINGS

The patient-based CRDTS Dental Hygiene Examination is administered throughout the calendar year at test sites located in CRDTS' member states. Due to the COVID-19 pandemic, administration of the patient-based CRDTS Dental Hygiene Examination was temporarily suspended at many testing locations in 2020. However, CRDTS continued offering the patient-based examination where facilities were available through 2020, and CRDTS intends to continue offering it in 2021.

CRDTS provides information about the patient-based CRDTS Dental Hygiene Examination to candidates and prospective candidates through its website at https://www.crdts.org.

Test Administration – Candidate Registration

Candidates register to take the patient-based CRDTS Dental Hygiene Examination by applying online and providing proof of qualification to sit for the examination (CRDTS Candidate Manual, 2020). Candidates must provide a U.S. government-issued social security number that becomes part of the candidate's record. Candidates are assigned a 10-digit number that becomes associated with all candidate forms and that can be used by candidates when accessing the CRDTS website (CRDTS Candidate Manual, 2020). Candidates are also required to submit a passport quality photo that becomes associated with their record.

The CRDTS website and the 2020 Candidate Manual provide detailed instructions and information regarding the application and registration process, including:

- Applying for the examination
- Uploading required documents
- Paying for an examination
- Monitoring candidate status

Finding 15: The CRDTS registration process appears straightforward. The information available to candidates is detailed and comprehensive. The candidate registration process appears to meet professional guidelines and technical standards.

Test Administration – Accommodation Requests

CRDTS complies with the Americans with Disabilities Act and provides reasonable accommodations to candidates with documented disabilities. Candidates with a disability are required to submit, along with their application, a written request for an auxiliary aid or modification (CRDTS Candidate Manual, 2020). In addition, candidates must provide documentation from a qualified health care provider, who must specify the portion of the exam for which the auxiliary aid or modification is needed. In determining whether to grant the use of auxiliary aids or modifications, CRDTS reserves the right to consider implications for examination security.

Finding 16: CRDTS' accommodation procedures appear consistent with professional guidelines and technical standards.

Test Administration – Test Centers and Test Sites

The patient-based CRDTS Dental Hygiene Examination is administered over several days at dental hygiene schools that serve as test sites. These test sites are located throughout California and other member states (CRDTS website). Testing dates are site-specific and arranged between CRDTS and the test site. Candidates are assigned to either a morning or afternoon testing session (CRDTS Candidate Manual, 2020).

Finding 17: Candidates have access to test sites in participating dental hygiene schools with trained examiners and controlled testing conditions.

Test Administration – Directions and Instructions to Candidates

The CRDTS website provides detailed information about the patient-based CRDTS Dental Hygiene Examination. In addition, the 2020 Candidate Manual provides detailed information to candidates about:

- Scope of the examination and examination procedures
- Examination materials and instruments
- Patient selection guidelines
- Reporting to the test center and test site
- Candidate orientation
- Test center and test site procedures

- Security procedures
- Standards of conduct
- Infection control requirements
- Examination scoring criteria
- Examination forms (to be completed before or during examination administration)

Finding 18: The directions and instructions provided to candidates appear straightforward. The information available to candidates is detailed and comprehensive.

Test Administration – Standardized Procedures and Testing Environment

All candidates are tested in the same type of environment, using the same equipment, under the same conditions (CRDTS Candidate Manual, 2020). All candidates are assessed on the same clinical skills, which are performed on a live patient in a clinic setting. All candidates are required to use the same specified set of instruments during the examination process. In addition, expendable dental hygiene materials are provided by test sites to all candidates. Candidates are required to provide protective eyewear for themselves and patients.

As part of the examination process, candidates are required to submit a live patient for acceptance and approval. Patients must meet specific criteria, including 6–10 teeth that have qualifying deposits of calculus (CRDTS Candidate Manual, 2020). While candidates incur point penalties for patient rejections, they are encouraged to submit an Alternate Submission with their initial selection. A maximum of four treatment submissions is allowed.

Finding 19: The procedures established for the test administration process and testing environment appear to be consistent with professional guidelines and technical standards.

Finding 20: The variability associated with use of live patients presents challenges to standardization. CRDTS has taken steps to increase standardization by defining criteria for minimum qualifying calculus; however, it is unclear how increased levels of complexity are accounted for with regard to minimum competence standards. While the level of complexity associated with calculus removal appears to vary based on patient presentation, scoring is dichotomous (points are assigned based on the presence or absence of remaining calculus).

CRDTS recognizes these challenges and actively monitors the reliability of the patient-based Dental Hygiene Examination. CRDTS has also begun offering an alternate examination that uses a typodont in place of a live patient, as referred to in The CRDTS Report, Winter 2018 (CRDTS Annual Report, 2018). The typodont is frequently used as a clinical training device to build skills before students are allowed to provide treatment on live patients or used as a remedial training device for building deficient skills. The typodont offers greater standardization in the testing process.

However, OPES does not endorse the use of this alternate examination in the absence of validity evidence that establishes the adequacy of the typodont as a measure of skills required for treating live patients in independent practice. OPES has agreed to evaluate any such evidence once provided by CRDTS.

RECOMMENDATIONS

Recommendation 6: OPES recognizes the standardization challenges associated with candidate submissions of live patients. However, standardization is an essential feature in administering examinations that are legally defensible, valid, and fair to candidates. OPES recommends that CRDTS continue to investigate new technologies and alternate means of assessing candidate skills as they relate to competence to practice as a dental hygienist.

CONCLUSIONS

Given the findings, the test administration protocols put in place by CRDTS appear consistent with professional guidelines and technical standards. However, OPES recommends options be considered to address standardization issues associated with the use of live patients.

CHAPTER 6 | EXAMINER TRAINING, SCORING, AND PERFORMANCE STANDARDS

STANDARDS

The following standards are most relevant to examiner training, test scoring, and performance for licensing examinations, as referenced in the *Standards.*

Standard 2.3

For each total score, subscore, or combination of scores that is to be interpreted, estimates of relevant indices of reliability/precision should be reported (p. 43).

Standard 4.10

When a test developer evaluates the psychometric properties of items, the model used for that purpose (e.g., classical test theory, item response theory, or another model) should be documented. The sample used for estimating item properties should be described and should be of adequate size and diversity for the procedure. The process by which items are screened and the data used for screening, such as item difficulty, item discrimination, or differential item functioning (DIF) for major examinee groups, should also be documented. When model-based methods (e.g., IRT) are used to estimate item parameters in test development, the item response model, estimation procedures, and evidence of model fit should be documented (pp. 88-89).

Standard 4.20

The process for selecting, training, qualifying, and monitoring scorers should be specified by the test developer. The training materials, such as the scoring rubrics and examples of test takers' responses that illustrate the levels on the rubric score scale, and the procedures for training scorers should result in a degree of accuracy and agreement among scorers that allows the scores to be interpreted as originally intended by the test developer. Specifications should also describe processes for assessing scorer consistency and potential drift over time in raters' scoring (p. 92).

Standard 4.21

When test users are responsible for scoring and scoring requires scorer judgment, the test user is responsible for providing adequate training and instruction to the scorers and for examining scorer agreement and accuracy. The test developer should document the expected level of scorer agreement and accuracy and should provide as much technical guidance as possible to aid test users in satisfying this standard (p. 92).

Standard 6.8

Those responsible for test scoring should establish scoring protocols. Test scoring that involves human judgment should include rubrics, procedures, and criteria for scoring. When scoring of complex responses is done by computer, the accuracy of the algorithm and processes should be documented (p. 118.)

The following regulations are relevant to the integrity of the use of examiners in scoring clinical examinations:

California B&P Code § 139 requires the Department of Consumer Affairs to develop a policy on examination validation which includes minimum requirements for psychometrically sound examination development.

OPES 20-01, as mandated by B&P Code § 139, specifies that board members, committee members, and instructors should not serve as expert consultants in the licensure examination development process. This is due to potential conflict of interest, undue influence, and security considerations.

FINDINGS

Examiner Selection and Training

The patient-based CRDTS Dental Hygiene Examination relies on the judgment of examiners to determine whether a candidate has demonstrated the skills required for competent dental hygiene practice. CRDTS has formed an Examiner Evaluation and Assignment Committee (EEAC) that maintains an examiner preparation program and sets the criteria for selecting examiners, coordinators, and team captains (CRDTS Technical Report, 2017).

Examiners are nominated by member state boards and must meet specific selection criteria. Among other requirements, an examiner must: (a) be an active dental hygiene practitioner in good standing with their state board, (b) have completed an educational program approved by the Commission on Dental Accreditation (CODA); (c) have passed a clinical examination with a patient-based component; (d) be willing to apply CRDTS-established examination standards and evaluation criteria; and (e) agree to commit to participating in a minimum of three examinations (CRDTS Technical Manual, 2017; CRDTS email communication, December 2020).

Examiners are provided with a copy of the Dental Hygiene Examiner's Manual, which provides specific scoring criteria and criteria for assessing penalties (CRDTS Technical Report, 2017). In addition, examiners undergo a calibration training process (CRDTS Technical Report, 2017). During this process, examiners engage in rating exercises designed to produce accurate and consistent ratings. In addition, all new examiners must observe examination administrations for one year before becoming an active examiner.

CRDTS maintains profiles for all examiners. After each administration, examiners are asked to evaluate fellow team members in terms of behavior, preparedness, adherence to protocols, and work ethic (Technical Report, 2017). These reports, along with the results of each examiner's rating accuracy and consistency, become part of a profile maintained for each examiner. Each year, the EEAC reviews examiner profiles for efficacy and revises roles if necessary. Examiners who do not provide accurate or consistent ratings may not be reappointed.

> Finding 21: The selection and training of examiners for the CRDTS Dental Hygiene Examination is generally consistent with professional guidelines and technical standards. However, the use of board members and educators as examiners is not fully compliant with OPES 20-01, as mandated by B&P Code § 139.

Examination Scoring

The patient-based CRDTS Dental Hygiene Examination uses a compensatory scoring model to assess a candidate's performance across four clinical domains (CRDTS Technical Report, 2017). A criterion-based scoring system is used to differentiate between acceptable and unacceptable performance in each clinical domain (CRDTS Candidate Manual, 2020). Once a candidate has completed treatment procedures on a patient, three examiners independently evaluate the candidate's performance using established scoring criteria. Scores are assigned based on the median rating of the three examiners.

CRDTS indicates that it uses a criterion-based scoring system to score items performed in each content domain on the patient-based Dental Hygiene Examination (CRDTS Candidate Manual, 2020). The stated purpose is to differentiate "between acceptable and unacceptable performance" by applying established criteria for each procedure performed (CRDTS Candidate Manual, 2020, p. 12).

Points on the examination are deducted for treatment selection or performance errors that are confirmed by two of three examiners (CRDTS Candidate Manual, 2020; CRDTS Technical Report, 2017). These point deductions are as follows:

- Patient submission rejection – 7 points each (first two rejections only)
- Improper record keeping – 2 points
- Failure to properly complete anesthetic documentation – 2 points
- Unprofessional demeanor – 2 points
- Infection control / asepsis violations – 2 points
- Patient management / inadequate pain control – 5 points
- Tissue trauma – 5 points each (up to two)

CRDTS has also identified critical errors that result in automatic failure. These critical errors include damage to three or more areas of gingiva or other tissues, amputated papilla, exposure of the alveolar process, laceration or damage requiring suture or periodontal packing, unreported broken instrument tip in sulcus, or ultrasonic burn requiring follow-up treatment (CRDTS Candidate Manual, 2020).

In addition to being assessed point penalties for performance and critical errors, candidates are assessed a 10-point time penalty if they arrive 1–15 minutes late to the host test site (CRDTS Candidate Manual, 2020).

A final score is calculated by applying point deductions on each of the subtests (content areas) (CRDTS Technical Report, 2017). Candidates must receive a minimum score of 75 of 100 possible points to pass the examination.

> Finding 22: CRDTS indicates that it uses a criterion-based scoring system to differentiate between "acceptable and unacceptable" performance. However, no information was provided regarding how the scoring criteria were developed.
>
> Finding 23: The scoring criteria are applied equitably and are generally consistent with professional guidelines and technical standards.
>
> Finding 24: Scoring penalties predominantly reflect errors or deficiencies associated with performance. However, the late penalty appears to be unrelated to performance standards required for safe and effective practice.
>
> Finding 25: In the content area Scaling/Subgingival Calculus Removal, candidates are assigned 5 points per item (surface) if examiners confirm the absence of detectable calculus following treatment. Similarly, 2 points per item (surface) are assigned in the content area Supragingival Deposit Removal. Scoring is dichotomous, and it appears that point assignments are not related to the level of case complexity.

Examination Performance

CRDTS performs analyses of test functioning and examiner performance for each examination administration (CRDTS Technical Report, 2017).

After each administration, CRDTS calculates descriptive statistics regarding overall examination performance, as well as for subtests (content areas). These statistics include: low and high scores, mean scores, standard deviation, and skewness. CRDTS also analyzes classical test statistics for each item within each of the subtests (content areas). Each item is analyzed in terms of mean item difficulty and discrimination power. OPES did not receive these analyses; however, the 2017 CRDTS Technical Report included these data for the 2017 administration. These 2017 data suggested a high degree of consistency and stability among items included in each of the subtests. OPES reviewed other reports of mean scores and pass rates across administrations, which suggested that results for the most recent administrations are likely consistent with the data present in the 2017 CRDTS Technical Report.

CRDTS also estimates the reliability of test scores each administration using a stratified alpha (CRDTS Technical Report, 2017). OPES was not provided with these estimates; however, the 2017 CRDTS Technical Report presents the result of analyses conducted in 2017 for each subtest and for the overall examination. The reliability coefficient for the 2017 administration

was .75, which is sufficient for a performance examination with the number of items included in the patient-based CRDTS Dental Hygiene Examination.

In addition, CRDTS also performs analyses of examiner rating performance. These analyses include evaluation of examiner agreement, which is typically high for all subtests. For the years 2016–2019, the percentages of agreement for all three examiners across the different subtests, as well as the percentages of agreement to confirm scoring, were within generally accepted ranges. CRDTS also evaluates examiner harshness or leniency (CRDTS Technical Report, 2017). For the years 2016–2019, CRDTS reported that "outliers" occurred at an acceptably low percentage of ratings made. No information was provided about how outliers were calculated or what constituted acceptable levels of agreement. Overall, data provided for the 2016–2019 administrations of the patient-based CRDTS Dental Hygiene Examination (2019) indicated examination and examiner statistics within generally accepted ranges.

Finding 26: Documentation regarding examination performance was limited. However, the data provided suggest that examination-level statistics are likely adequate for performance examinations.

Finding 27: Documentation regarding examiner performance, particularly regarding "outliers," was limited. However, the information provided indicated examiner performance statistics are likely adequate for performance examinations.

RECOMMENDATIONS

Recommendation 7: OPES recognizes that CRDTS requires the participation of practitioners from member states to develop and administer examinations. In order to be fully compliant with OPES 20-01, OPES recommends phasing out the service of board members and educators as examiners in the administration of the patient-based CRDTS Dental Hygiene Examination.

Recommendation 8: CRDTS states that it uses a criterion-based scoring system to differentiate between acceptable and unacceptable performance. OPES recommends that CRDTS provide additional documentation regarding how these scoring criteria were developed and how they related to minimum competence standards for safe, entry-level practice. This documentation should include a description of the use of SME judgments in determining these criteria.

Recommendation 9: The content and scoring criteria for licensure examinations should clearly reflect the competencies necessary for practice. The scoring criteria used on the patient-based CRDTS Dental Hygiene Examination appear to generally reflect the competencies required for dental hygiene practice, with penalties for performance error or critical errors. However, the time penalty appears unrelated to competency for practice. OPES recommends reviewing scoring criteria to define how this penalty relates to the competencies required for practice or removing this penalty from the scoring process.

Recommendation 10: CRDTS has provided minimum qualifying calculus standards to satisfy patient treatment submission criteria. It appears that the higher the level of detectible calculus, the less likely candidates are to face penalties associated with patient treatment rejections. However, it is unclear whether there is a relationship between more challenging cases and successful treatment outcomes. Further, it is unclear whether more challenging cases reflect minimum competence for professional practice or are associated with higher levels of competence. OPES recommends that CRDTS clarify the relationship between case complexity and minimum competence standards.

Recommendation 11: OPES recommends that CRDTS provide additional documentation of analyses conducted on overall examination performance and examiner agreement. Documentation regarding examiner agreement should include information about rater agreement across test sites, as well as how instances of rater consistency or leniency are defined, evaluated, and managed. In addition, documentation should provide an explanation for reporting examiner agreement for the subtests Periodontal Probing and Supragingival Deposit Removal as a single proportion.

CONCLUSIONS

The steps taken by CRDTS to score the patient-based Dental Hygiene Examination generally appear to provide for a relatively fair and objective evaluation of candidate performance. However, OPES recommends that CRDTS review scoring criteria to establish a clear connection between the time penalty and competence for dental hygiene practice or that CRDTS consider revision of this penalty. OPES further recommends that CRDTS clarify the link between case complexity and minimum competence with regard to dichotomous scoring of calculus removal.

The steps taken by CRDTS to evaluate examination and examiner performance appear to be reasonable. However, OPES recommends that CRDTS provide additional information and documentation regarding examiner agreement and analyses pertaining to examiner harshness or leniency.

CHAPTER 7 | TEST SECURITY

STANDARDS

The following standards are most relevant to test security for licensure examinations, as referenced in the *Standards.*

Standard 6.6

Reasonable efforts should be made to ensure the integrity of test scores by eliminating opportunities for test takers to attain scores by fraudulent or deceptive means (p. 116).

Standard 6.7

Test users have the responsibility of protecting the security of test materials at all times (p. 117).

Standard 8.9

Test takers should be made aware that having someone else take the test for them, disclosing confidential test material, or engaging in any other form of cheating is unacceptable and that such behavior may result in sanctions (p. 136).

Standard 9.21

Test users have the responsibility to protect the security of tests, including that of previous editions (p. 147).

FINDINGS

Test Security – Examination Materials and Candidate Information

For the patient-based CRDTS Dental Hygiene Examination, the content, scoring criteria, and passing score are made public and are available in the 2020 CRDTS Candidate Manual.

All examination materials and equipment used to administer the examination are prepared by CRDTS staff for distribution to test sites before the date of administration (CRDTS email communication, December 2020). Materials and scoring equipment are individually numbered and securely sealed in containers for transport to test sites by a national shipping company (CRDTS Technical Report, 2017). At each test site, the containers are verified and stored in a locked room. Only CRDTS staff have access to and authority to unseal the containers. After test administration, CRDTS staff securely seal examination materials and equipment in the containers for return shipping.

During the registration process, candidates are required to submit a passport quality photograph (CRDTS Candidate Manual, 2020). This photograph becomes part of each candidate's Candidate Profile and is printed on a Candidate ID Badge. Candidates are required to provide a

valid form of identification upon check-in at examination sites and must wear their Candidate ID Badge throughout the examination. All examination materials are preprinted with each candidate's sequence number and individual ID number, and a candidate's materials are matched against their Candidate ID Badge for accuracy (CRDTS Technical Report, 2017). In addition, electronic equipment used at testing sites to score examinations is preloaded with each candidate's ID number and the ID numbers of all examiners assigned to test sites.

All examiners and candidates are required to sign non-disclosure agreements, certifying confidentiality compliance regarding examination-related materials (CRDTS email communication, December 2020). Candidate are permitted to bring the Candidate Manual and approved examination materials to test sites, but all other outside references or materials are prohibited. In addition, candidates are prohibited from bringing recording devices, cell phones, smartwatches, or other electronic devices into test sites (CRDTS Candidate Manual, 2020).

CRDTS provides backup electronic equipment at each test site. A dedicated wireless system is used to encrypt and securely upload examiner evaluations of candidate performance. The system is monitored by an IT proctor throughout the examination to ensure proper uploading of results. After administration, test files are downloaded to a flash drive and uploaded to CRDTS' secure scoring website to prepare for final scoring and release of results (CRDTS Technical Report, 2017).

> Finding 28: The security procedures practiced by CRDTS with regard to the maintenance of examination materials and candidate information are consistent with professional guidelines and technical standards.

Test Security – Test Sites

CRDTS maintains test site security policies and procedures. Only authorized CRDTS personnel, examiners, and candidates are allowed to access test facilities providing test administration. CRDTS personnel, examiners, and candidates are required to wear identification at all times during test administration.

> Finding 29*:* The security procedures practiced by CRDTS regarding test sites are consistent with professional guidelines and technical standards.

CONCLUSIONS

Given the findings, the test security policies, procedures, and protocols meet professional guidelines and technical standards.

CHAPTER 8 | COMPARISON OF THE CALIFORNIA REGISTERED DENTAL HYGIENIST EXAMINATION OUTLINE TO THE CRDTS DENTAL HYGIENE EXAMINATION CONTENTS

PARTICIPATION OF SUBJECT MATTER EXPERTS

OPES convened a 2-day workshop on May 14–15, 2020 to evaluate and compare the following items:

- The task and knowledge statements of the California description of practice resulting from the 2019 California Occupational Analysis of the Registered Dental Hygienist Profession (California RDH OA, 2019).
- The examination content of the patient-based CRDTS Dental Hygiene Examination.

OPES recruited seven registered dental hygienists to participate in the workshop as SMEs.

The SMEs represented the profession in terms of geographic location in California. Two of the SMEs had been licensed for 1–5 years, one had been licensed for 6–10 years, three had been licensed for 11–19 years, and one had been licensed for more than 20 years. All SMEs worked as dental hygienists in various settings.

WORKSHOP PROCESS

First, the SMEs completed OPES' security agreement, self-certification, secure area agreement, and personal data (demographic) forms. The OPES facilitator explained the importance of, and the guidelines for, security during and outside the workshop. The SMEs were then asked to introduce themselves.

Next, the OPES facilitator gave a PowerPoint presentation about the purpose and importance of occupational analysis, validity, content validity, reliability, test administration standards, examination security, and the role of SMEs. The OPES facilitator also explained the purpose of the workshop.

The SMEs were instructed to evaluate and link each task and knowledge statement of the California description of practice to the task statements of the patient-based CRDTS Dental Hygiene Examination blueprint. To ensure that each SME understood the linkage process, the OPES facilitator had the SMEs work as a group to evaluate and link all of the task and knowledge statements of the California description of practice.

The content domain of the patient-based CRDTS Dental Hygiene Examination is provided in Table 1. Table 2 provides the content areas of the 2019 California description of practice.

TABLE 1 – CRDTS NATIONAL DENTAL HYGIENE EXAMINATION BLUEPRINT CONTENT DOMAINS

Domain	Weight
1. Extra/intra Oral Assessment	16%
2. Periodontal Probing	12%
3. Scaling/Subgingival Calculus Removal	60%
4. Supragingival Deposit Removal	12%
Total	**100%**

TABLE 2 – CONTENT AREAS OF THE 2019 CALIFORNIA REGISTERED DENTAL HYGIENIST EXAMINATION OUTLINE

	Content Area	Content Area Description	Weight
1.	Treatment Preparation	This area assesses the candidate's knowledge of preparing the operatory and patient dental hygiene services.	5%
2.	Dental Hygiene Treatment	This area assesses the candidate's knowledge of completing a comprehensive oral health assessment, dental hygiene treatment planning, and dental hygiene treatment.	40%
3.	Patient Education	This area assesses the candidate's knowledge of educating patients regarding oral health and individualized oral hygiene instructions.	10%
4.	Infection Control	This area assesses the candidate's knowledge of maintaining a safe and clean work environment and adhering to infection control protocols and standard precautions.	15%
5.	Documentation	This area assesses the candidate's knowledge of documenting patient oral health status, procedures performed, and updating patient dental records.	5%
6.	Laws, Regulations, and Ethics	This area assesses the candidate's knowledge of licensing requirements, professional conduct, patient confidentiality, use of telehealth methods and technology, and mandated reporting.	25%
	Total		**100%**

FINDINGS

The SMEs compared the task and knowledge statements of the 2019 California description of practice outline and the CRDTS Dental Hygiene Examination blueprint. The SMEs concluded that the patient-based CRDTS Dental Hygiene Examination adequately assessed the skills required for entry-level dental hygiene practice in California in the following four areas:

- Treatment Preparation
- Dental Hygiene Treatment
- Infection Control
- Documentation

The SMEs indicated that the patient-based CRDTS Dental Hygiene Examination did not adequately assess the content area Patient Education, but this content area was determined to be adequately assessed by other assessment measures. In addition, SMEs indicated that the patient-based CRDTS Dental Hygiene Examination did not adequately assess the content area Laws, Regulations, and Ethics. However, this content is measured by the California-specific Registered Dental Hygienist Law and Ethics Examination.

> Finding 30: The SMEs concluded that the content of the patient-based CRDTS Dental Hygiene Examination adequately assesses the general skills required for entry-level dental hygiene practice in California identified in the California RDH OA, 2019.
>
> Finding 31: The SMEs concluded that the content of the patient-based CRDTS Dental Hygiene Examination does not adequately assess the laws and ethics required for practice in California. SMEs concluded that this content should continue to be measured using a California-specific law and ethics examination.

CONCLUSIONS

Overall, the SMEs concluded that the content of the patient-based CRDTS Dental Hygiene Examination sufficiently assesses the skills dental hygienists are expected to have mastered at the time of licensure.

CHAPTER 9 | CONCLUSIONS

COMPREHENSIVE REVIEW OF THE CRDTS DENTAL HYGIENIST EXAMINATION

OPES completed a comprehensive analysis and evaluation of the documents provided by CRDTS.

OPES finds that the procedures used to establish and support the validity and defensibility of the patient-based CRDTS Dental Hygiene Examination (i.e., OA, examination development, test registration and administration, examination scoring and performance, and test security) *generally* meet professional guidelines and technical standards outlined in the *Standards* and B&P Code § 139. However, to be fully compliant with OPES 20-01, OPES recommends phasing out the service of board members and educators in examination development processes. Further, the process of establishing passing scores fails to demonstrate a robust methodology.

In addition, OPES made several recommendations related to standardization, scoring, and documentation processes. These recommendations are as follows:

1) OPES recommends that CRDTS consider methods to improve standardization in relation to patient selection. The use of live patients in licensure examinations presents challenges to standardization; however, standardization is an essential feature of examinations that are legally defensible, valid, and fair. CRDTS regularly reviews the performance of the patient-based CRDTS Dental Hygiene Examination and takes steps to maximize standardization; however, it appears that there may be some variability with regard to patient presentation and case complexity. CRDTS has defined a minimum qualifying calculus standard associated with minimum competence, but it is unclear how higher levels of complexity are addressed. Scoring on calculus removal is dichotomous, regardless of case complexity. OPES recommends that CRDTS review the patient selection component of the examination and provide a clear connection between scoring criteria, case complexity, and minimum competence.

2) Scoring criteria should be directly related to the competencies required for practice and should not reflect undesirable behaviors that are not related to these professional competencies. Therefore, OPES recommends that CRDTS review the late penalty deduction. This penalty should be revised, or a connection should be established between this penalty and minimum competence.

3) OPES recommends that CRDTS take steps to increase documentation of processes used in the examination development process. Recommendations include providing clear descriptions of all procedures used to develop the examination, set the passing score, and establish scoring criteria. In addition, while CRDTS provides the Board with annual reports regarding the performance of California candidates by educational institution, it excludes candidates from educational institutions with fewer than four candidates. OPES recommends that reports be revised to include information for all

California candidates, or that additional reports be provided containing this information. Further, OPES recommends that CRDTS provide information regarding the number and type of all penalties assessed on California candidates so that an accurate evaluation of candidate performance can be made.

Based on the evaluations presented in this report, OPES finds that the content of the patient-based CRDTS Dental Hygiene Examination *generally* measures the skills related to California dental hygiene practice.

However, practical examinations typically face issues with one or more of the following: standardizing procedures and materials, inter-rater reliability, validating scoring criteria, and setting passing scores that reflect minimum competence. These issues are exacerbated by the addition of live patients. OPES recommends that the Board consider conducting an evaluation to determine whether a skills-based examination remains a necessary component of assessing a candidate's competence for practice. Given the level of training and clinical assessment that dental hygiene candidates receive in educational programs, requiring a knowledge-based examination may be sufficient to assess minimum competence for licensure.

CHAPTER 10 | REFERENCES

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DHBC
Dental Hygiene
Board of California

REVIEW OF THE WESTERN REGIONAL EXAMINING BOARD (WREB) DENTAL HYGIENE EXAMINATION

STATE OF CALIFORNIA
dca
DEPARTMENT OF CONSUMER AFFAIRS

DENTAL HYGIENE BOARD OF CALIFORNIA

REVIEW OF THE WESTERN REGIONAL EXAMINING BOARD (WREB) DENTAL HYGIENE EXAMINATION

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This report is mandated by California Business and Professions (B&P) Code § 139 and by DCA Licensure Examination Validation Policy OPES 18-02.

EXECUTIVE SUMMARY

Licensing boards and bureaus within the California Department of Consumer Affairs (DCA) are required to ensure that examination programs used in the California licensure process comply with psychometric and legal standards. The Dental Hygiene Board of California (Board) requested that DCA's Office of Professional Examination Services (OPES) complete a comprehensive review of the patient-based Western Regional Examining Board (WREB) Dental Hygiene Examination. The purpose of the OPES review was to evaluate the suitability of the patient-based WREB Dental Hygiene Examination for use in California licensure.

To become licensed as a registered dental hygienist in California, the Board requires candidates to have requisite education and experience and to pass three examinations:

1. The National Board Dental Hygiene Examination (NBDHE)
2. The Western Regional Examining Board (WREB) Dental Hygiene Examination or the Central Regional Dental Testing Service (CRDTS) Dental Hygiene Examination
3. The California Registered Dental Hygienist Law and Ethics Examination

The WREB Dental Hygiene Examination is a patient-based clinical examination that measures a candidate's skill in four areas:

1. Extraoral and Intraoral Examination
2. Periodontal Assessment
3. Calculus Removal
4. Tissue Management

Within these areas, candidates are specifically evaluated on their ability to adhere to patient selection criteria, and to perform:

- Extraoral and intraoral examination
- Periodontal pocket measurement and recording (12 surfaces)
- Gingival recession assessment and recording (3 qualifying surfaces)
- Classification of furcation involvement
- Classification of mobility
- Identification of type of radiographic bone loss
- Classification of severity of bone loss
- Classification of severity of periodontal disease
- Calculus detection and removal (12 qualifying surfaces)
- Tissue management

In 2017, WREB collaborated with CRDTS to conduct an occupational analysis (OA) for the dental hygienist profession and to update the examination blueprint for the patient-based WREB Dental Hygiene Examination.

OPES, in collaboration with the Board, received and reviewed the results of the 2017 OA, as well as other documents provided by WREB. OPES performed a comprehensive evaluation of the documents to determine whether the following test program components met professional guidelines and technical standards: (a) OA, (b) examination development, (c) passing scores and passing rates, (d) test registration and administration, (e) examination scoring and performance, and (f) test security procedures. Follow-up emails were exchanged to clarify the procedures and practices used to validate and develop the patient-based WREB Dental Hygiene Examination.

OPES found that the procedures used to develop and administer the patient-based WREB Dental Hygiene Examination are generally consistent with professional guidelines and technical standards outlined in the *Standards for Educational and Psychological Testing* (2014) *(Standards)* and California Business and Professions (B&P) Code § 139. However, OPES made recommendations for WREB to consider, particularly regarding standardization and scoring.

In addition to reviewing documents provided by WREB, OPES convened a workshop of licensed California registered dental hygienists to serve as subject matter experts (SMEs) to review the content of the patient-based WREB Dental Hygiene Examination. The SMEs were selected by the Board to represent the profession in terms of geographic location, experience, and specialty. The purpose of the review workshop was to compare the content of the patient-based WREB Dental Hygiene Examination with the California registered dental hygienist description of practice that resulted from the 2019 California Occupational Analysis of the Registered Dental Hygienist Profession (California RDH OA, 2019) performed by OPES. During this workshop, the SMEs compared the task and knowledge statements from the California description of practice to the examination content of the patient-based WREB Dental Hygiene Examination. A linkage study was performed to identify whether there were areas of California dental hygiene practice that are not measured by the patient-based WREB Dental Hygiene Examination.

The results of the linkage study indicated that skills associated with four of the six areas included in the California dental hygiene description of practice were adequately linked to the content of the patient-based WREB Dental Hygiene Examination. SMEs concluded that one of the content areas, Patient Education, was not adequately assessed by the patient-based WREB Dental Hygiene Examination. However, SMEs determined that this content area is assessed by other examinations. In addition, the SMEs indicated that the content area Laws, Regulations, and Ethics was not adequately assessed by the content of the patient-based WREB Dental Hygiene Examination and should continue to be measured by the California-specific law and ethics examination.

In its evaluation, OPES found that while the patient-based WREB Dental Hygiene Examination was *generally* consistent with technical standards regarding validity, there are standardization challenges associated with the use of live patients. OPES further found a consistently high passing rate on the patient-based WREB Dental Hygiene Examination. This may indicate that candidates receive sufficient training in their pre-licensure clinical examinations to prepare them for safe and effective dental hygiene practice. Given these findings, OPES recommends that the

Board consider conducting an evaluation to determine whether a skills-based examination is necessary for assessing a candidate's competence for practice, or whether a knowledge-based examination may be sufficient to assess minimum competence for licensure.

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CHAPTER 1 | INTRODUCTION

PURPOSE OF THE COMPREHENSIVE REVIEW

Licensing boards and bureaus within the California Department of Consumer Affairs (DCA) are required to ensure that examination programs used in the California licensure process comply with psychometric and legal standards. The public must be reasonably confident that an individual passing a licensure examination has the requisite knowledge and skills to competently and safely practice in the profession.

The Dental Hygiene Board of California (Board) requested that DCA's Office of Professional Examination Services (OPES) complete a comprehensive review of the patient-based Western Regional Examining Board (WREB) Dental Hygiene Examination. The WREB Dental Hygiene Examination is a patient-based clinical examination that measures a candidate's competence in performing skills associated with calculus removal and periodontal assessments. The examination comprises four content areas:

1. Extraoral and Intraoral Examination
2. Periodontal Assessment
3. Calculus Removal
4. Tissue Management

Within these areas, candidates are specifically evaluated on their ability to adhere to patient selection criteria, and to perform:

- Extraoral and intraoral examinations
- Periodontal pocket measurements and recording (12 surfaces)
- Gingival recession assessments and recording (3 qualifying surfaces)
- Classification of furcation involvement
- Classification of mobility
- Identification of type of radiographic bone loss
- Classification of severity of bone loss
- Classification of severity of periodontal disease
- Calculus detection and removal (12 qualifying surfaces)
- Tissue management

OPES' review of the patient-based WREB Dental Hygiene Examination had three purposes:

1. To evaluate the suitability of the patient-based WREB Dental Hygiene Examination for continued use in California.

2. To determine whether the patient-based WREB Dental Hygiene Examination meets the professional guidelines and technical standards outlined in the *Standards for*

Educational and Psychological Testing (2014) *(Standards)*[1] and California Business and Professions (B&P) Code § 139.

3. To identify any areas of California dental hygiene practice that the patient-based WREB Dental Hygiene Examination does not assess.

In relation to the *Standards*, evaluating the acceptability of an examination does not involve determining whether the examination satisfies each individual standard interpreted literally. The importance of each standard varies according to circumstances. Page 7 of the *Standards* states:

> Individual standards should not be considered in isolation. Therefore, evaluating acceptability depends on (a) professional judgment that is based on a knowledge of behavioral science, psychometrics, and the relevant standards in the professional field to which the test applies; (b) the degree to which the intent of the standard has been satisfied by the test developer and user; (c) the alternative measurement devices that are readily available; (d) research and experiential evidence regarding the feasibility of meeting the standard; and (e) applicable laws and regulations.

OPES, in collaboration with the Board, requested documentation from WREB to determine whether the following patient-based WREB Dental Hygiene Examination program components met professional guidelines and technical standards outlined in the *Standards* and B&P Code § 139: (a) occupational analysis (OA),[2] (b) examination development, (c) passing scores and passing rates,[3] (d) test registration and administration, (e) examination scoring and performance, and (f) test security procedures.

CALIFORNIA LAW AND POLICY

Section 139 (a) of the California B&P Code states:

> The Legislature finds and declares that occupational analyses and examination validation studies are fundamental components of licensure programs.

It further requires that DCA develop a policy to address the minimum requirements for psychometrically sound examination validation, examination development, and occupational analyses, including standards for the review of state and national examinations.

DCA Licensure Examination Validation Policy OPES 18-02 (OPES 18-02) specifies the *Standards* as the most relevant technical and professional standards to be followed to ensure that examinations used for licensure in California are psychometrically sound, job-related, and legally defensible.

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[1] See Chapter 10 for the complete reference to the *Standards.*
[2] An occupational analysis is also known as a job analysis, practice analysis, or task analysis.
[3] A passing score is also known as a pass point or cut score.

FORMAT OF THE REPORT

The chapters of this report provide the relevant standards related to psychometric aspects of the patient-based WREB Dental Hygiene Examination and describe the findings and recommendations that OPES identified during its review.

CHAPTER 2 | OCCUPATIONAL ANALYSIS

STANDARDS

The following standard is most relevant to conducting OAs for licensure examinations, as referenced in the *Standards.*

> **Standard 11.13**
>
> The content domain to be covered by a credentialing test should be defined clearly and justified in terms of the importance of the content for credential-worthy performance in an occupation or profession. A rationale and evidence should be provided to support the claim that the knowledge or skills being assessed are required for credential-worthy performance in that occupation and are consistent with the purpose for which the credentialing program was instituted (pp. 181-182).

The comment following Standard 11.13 emphasizes its relevance:

> *Comment:* Typically, some form of job or practice analysis provides the primary basis for defining the content domain. If the same examination is used in the credentialing of people employed in a variety of settings and specialties, a number of different job settings may need to be analyzed. Although the job analysis techniques may be similar to those used in employment testing, the emphasis for credentialing is limited appropriately to knowledge and skills necessary for effective practice . . .
>
> In tests used for licensure, knowledge and skills that may be important to success but are not directly related to the purpose of licensure (e.g., protecting the public) should not be included (p. 182).

California B&P Code § 139 requires that each California licensing board, bureau, commission, and program report annually on the frequency of its OAs and the validation and development of its examinations. OPES 18-02 states:

> Generally, an occupational analysis and examination outline should be updated every five years to be considered current; however, many factors are taken into consideration when determining the need for a different interval. For instance, an occupational analysis and examination outline must be updated whenever there are significant changes in a profession's job tasks and/or demands, scope of practice, equipment, technology, required knowledge, skills and abilities, or laws and regulations governing the profession (p. 4).

FINDINGS

In 2017, WREB collaborated with the Central Regional Dental Testing Service (CRDTS) to conduct an OA for the dental hygiene profession. This OA was conducted at the national level. Results of this OA were documented for a presentation at a CRDTS and WREB Joint Dental Hygiene Practice Analysis Meeting in 2018 (CRDTS and WREB Joint Meeting, 2018), and in the WREB 2017–18 Dental Hygiene Practice Analysis: Report of Findings Prepared for the CRDTS and WREB Joint Dental Hygiene Practice Analysis Committee (WREB Practice Analysis Report, 2020). Additional information regarding this study was obtained through other technical reports and documentation provided by WREB, from WREB's website, and through email communication with WREB representatives.

Occupational Analysis – Goals, Methodology and Time Frame

The purpose of the OA was to provide evidence to state licensing boards in support of decisions regarding candidate readiness for professional practice, to draw reliable inferences regarding minimal competence from candidate performance, and to determine the appropriate content to assess performance levels and set passing standards (CRDTS and WREB Joint Meeting, 2018). The methodology used to conduct the OA was an online survey that described the practices (job tasks) performed by dental hygienists.

The survey was developed by WREB and CRDTS and was designed to be comparable to surveys administered by both testing agencies in prior OAs. A Joint Dental Hygiene Practice Analysis Committee (Practice Analysis Committee) was also involved in the development process. The Practice Analysis Committee comprised six subject matter experts (SMEs), who were selected from WREB and CRDTS member states. All SMEs had a minimum of 20 years of experience in the dental hygiene profession and were experienced board examiners or dental hygiene educators (WREB Practice Analysis Report, 2020).

The online survey was then completed by dental hygienists who were members of the American Dental Hygienists' Association (ADHA).

> Finding 1: The most recent OA was completed in 2017. The OA was conducted within a time frame considered to be current and legally defensible.
>
> Finding 2: The previous OA conducted by WREB occurred in 2009. This interval exceeds the DCA policy established under B&P Code § 139, which specifies that an OA should be conducted every 5 years.

Occupational Analysis – Development of Survey Instrument

In 2017, WREB and CRDTS collaboratively developed a survey to perform an OA of dental hygiene practice. The survey was developed by evaluating the major content domains and practices (tasks) listed on previous surveys administered by both organizations. Similar practice statements were combined, and additional restorative and anesthesia practices were added (WREB email communication, June 2020). Three WREB SMEs from the Practice Analysis

Committee reviewed the practice (task) statements and the final survey. CRDTS SMEs on the Practice Analysis Committee also reviewed the statements and survey (WREB email communication, June 2020).

The final survey included three sections. The first section comprised eight demographic questions designed to gather information about the survey respondents and their practice setting. This section also included questions specifically for respondents who practiced in a clinical setting. The section asked them how frequently they performed adult prophylaxis procedures, non-surgical periodontal procedures, and periodontal maintenance procedures. The second section of the survey comprised 49 practices (tasks) that were distributed across three content areas related to dental hygiene practice. Respondents were asked to rate each practice (task) on two rating scales: importance to practice (very important, somewhat important, or less important) and frequency of performance of the task (routinely, occasionally, or rarely). The third section of the survey asked respondents to provide comments or suggestions (WREB Practice Analysis Report, 2020).

> Finding 3: The procedures used by WREB to develop the survey instrument generally comply with professional guidelines and technical standards.
>
> Finding 4: The development of the survey involved six SMEs, all of whom were licensed more than 20 years. To better represent the profession in terms of geographical location and level of experience, more than six SMEs should be involved in the survey development process.

Occupational Analysis – Sampling Plan

The sampling plan for the study consisted of sending invitation emails to all of the 14,418 members of the ADHA in October 2017 (WREB, Practice Analysis Report, 2020).

Of the 14,418 members, 27% of the respondents completed the survey with enough detail to provide valid data. Of the 3,901 usable respondents, 27% were from the western region of the United States, with 228 (5.8%) from California.

> Finding 5: The intent of the sampling plan and the overall response rate were acceptable. The number of survey respondents from California was sufficient to provide representation of licensed California registered dental hygienists.

Occupational Analysis – Survey Results

After administering the survey, WREB and CRDTS collected the data and analyzed the survey results. Analyses included descriptive statistics calculated for each dental hygiene practice (task) included on the survey. Ratings on frequency and importance scales were combined using a multiplicative model that resulted in a potential range of 1 to 9. The frequency-importance product values were rank-ordered and presented to the Practice Analysis Committee for review.

Analyses also included correlation and linear regression to compare results for dental hygiene practices (tasks) with the results obtained from previous OA surveys. Overall, frequency-importance values for practices (tasks) included on the current OA had a correlation of .98 with those included on a previous OA conducted by WREB in 2009 (WREB Practice Analysis Report, 2020).

> Finding 6: The respondents included dental hygienists throughout the United States. Of the respondents, 48.4% had been practicing for 20 years or longer, 22.1% had been practicing for 10–20 years, 10% had been practicing for 5–10 years, and 18.6% had been practicing for less than 5 years. Approximately 51% of respondents were from WREB and CRDTS member states, while 49% were from other states.
>
> A majority of respondents indicated practicing in a private setting (75.6%), while 19.5% indicated that they worked in an educational setting. Fewer than 10% of respondents gave their practice setting as either a public health agency, corporate dental office, hospital/care facility, or the military.
>
> Four questions on the survey were directed toward dental hygienists who were actively practicing in a clinical setting. These questions pertained to the frequency of adult prophylaxis, non-surgical periodontal procedures, and periodontal maintenance procedures performed. All other practices (tasks) were rated by all survey respondents.

Occupational Analysis – Decision Rules and Final Examination Blueprint

The results of the survey were reviewed by the Practice Analysis Committee in April 2018. The Practice Analysis Committee SMEs discussed the results of the survey in conjunction with WREB's current examination blueprint. SMEs evaluated whether there were any prominent shifts in practice and whether any changes were required on the current WREB Dental Hygiene Examination (WREB Practice Analysis Report, 2020).

The Practice Analysis Committee SMEs indicated that there were no major shifts in the practices (tasks) performed by dental hygienists. The SMEs further determined that the practices (tasks) of intraoral examination, periodontal assessment, gingival recession assessment, and non-surgical periodontal treatments continue to be important and should remain the major components of the patient-based WREB Dental Hygiene Examination (WREB Practice Analysis Report, 2020).

> Finding 7: The linkage between the practices (tasks) required for entry-level dental hygienists and the major content areas of the WREB Dental Hygiene Examination demonstrates a sufficient level of validity, thereby meeting professional guidelines and technical standards.

RECOMMENDATIONS

Recommendation 1: DCA policy established under B&P Code § 139 specifies that, generally, boards should perform an OA every 5 years. OPES recommends that WREB adopt this interval for conducting OAs.

Recommendation 2: Results of OAs are used to develop licensure examinations that measure the competencies required for practice. To ensure that examination content accurately reflects these competencies, survey responses should be obtained from licensed dental hygienists who are currently practicing. With the exception of responses to four questions, it appears that ratings of practices on the WREB OA survey included responses from licensees who may not have been actively providing clinical services. OPES recommends that future OAs exclude responses obtained from dental hygienists who are retired or otherwise not currently engaged in dental hygiene practice.

Recommendation 3: Licensure examinations should measure the competencies required at initial licensure, and not those gained over time. As such, examination content should be based on the results of an OA that includes a representative sample of entry-level practitioners. Entry-level is generally defined as a practitioner licensed 5 years or less. OPES recognizes the sampling limitations involved in conducting an OA of this scope, and commends the efforts made by WREB to sample from this demographic. However, OPES recommends that future OAs attempt to increase the participation of practitioners licensed less than 5 years to ensure adequate representation of entry-level perspectives.

CONCLUSIONS

The OA conducted by WREB appears to be reasonably consistent with professional guidelines and technical standards. Additionally, the examination blueprint for the patient-based WREB Dental Hygiene Examination appears to be based on the results of the OA, which is consistent with professional guidelines and technical standards.

CHAPTER 3 | EXAMINATION DEVELOPMENT

STANDARDS

Examination development includes many steps within an examination program, from the development of an examination outline to scoring and analyzing items after the administration of an examination. Several specific activities involved in the examination development process are evaluated in this section. The activities include development of examination content, linkage of examination content to the examination outline, and developing scoring criteria.

The following standards are most relevant to examination development for licensure examinations, as referenced in the *Standards.*

> **Standard 4.7**
>
> The procedures used to develop, review, and try out items and to select items from the item pool should be documented (p. 87).
>
> **Standard 4.12**
>
> Test developers should document the extent to which the content domain of a test represents the domain defined in the test specifications (p. 89).

The following regulations are relevant to the integrity of the examination development process:

> California B&P Code § 139 requires the Department of Consumer Affairs to develop a policy on examination validation which includes minimum requirements for psychometrically sound examination development.
>
> DCA Policy Participation in Examination Development Workshops OPES 20-01 (OPES 20-01), as mandated by B&P Code § 139, specifies that board members, committee members, and instructors should not serve as expert consultants in the licensure examination development process. This is due to potential conflict of interest, undue influence, and security considerations.

FINDINGS

<u>Examination Development – Subject Matter Experts (SMEs)</u>

In 1979, WREB began administration of the patient-based WREB Dental Hygiene Examination (WREB email communication, June 2020). The predominant content areas have remained relatively consistent: extraoral and intraoral examination, periodontal assessment, calculus detection, and calculus removal. However, elements within the examination have undergone revision, including the number of tooth surfaces evaluated, the type and extent of calculus accepted, and weighing and scoring. Revisions were made based on evidence regarding professional practice. Revisions included evaluation by SMEs, review of multi-year data analyses, and field testing where applicable (WREB email communication, June 2020).

At least once a year, the content of the WREB Dental Hygiene Examination undergoes review by the WREB Dental Hygiene Examination Review Board (ERB) and other examination-specific committees (WREB Practice Analysis Report, 2020). The ERB consists of representatives from WREB's member states, and includes dental hygienists, dental hygiene educators, and dentists who serve as SMEs. SMEs who serve on WREB committees also review the results of practice analysis surveys, current dental hygiene curricula, and standards of competency to assure that the content and protocol of the patient-based WREB Dental Hygiene Examination remain current and relevant to practice.

> Finding 8: The procedures used to develop and review the content of the patient-based WREB Dental Hygiene Examination appear relatively consistent with professional guidelines and technical standards. However, the use of educators in the development process is not fully compliant with OPES 20-01, as mandated by B&P Code § 139.

Examination Development – Linkage to Examination Blueprint

In 2018, the Practice Analysis Committee met and verified the linkage between the results of the most current OA and the content domains of the patient-based WREB Dental Hygiene Examination blueprint (examination specifications). In addition, other WREB committees reviewed the results of the OA and confirmed the accuracy of the content domains specified in the patient-based WREB Dental Hygiene Examination blueprint (WREB Practice Analysis Report, 2020).

> Finding 9: The methods used to establish the linkage between examination content and the competencies necessary for practice are consistent with professional guidelines and technical standards.

Examination Development – Item Field Testing

The WREB Dental Hygiene Examination is a patient-based clinical examination that measures a candidate's ability to competently perform skills in four main areas of dental hygiene practice. According to the WREB 2019 Technical Report for Dental Hygiene Examinations (WREB Technical Report, 2020), the items included in the content domains of the WREB Dental Hygiene Examination are the product of years of field testing and refinement. In addition, WREB performs ongoing SME review of item performance in frequent committee meetings. WREB also performs statistical analyses to provide empirical evidence regarding the functioning of examination content (WREB Technical Report, 2020).

> Finding 10: The procedures used to develop, review, and field test items that comprise the patient-based WREB Dental Hygiene Examination are consistent with professional guidelines and technical standards.

Examination Development – Examination Forms

The content domains included in the patient-based WREB Dental Hygiene Examination remain consistent across examination administrations. Candidates are assessed on skills related to

calculus removal and periodontal assessments. The assessment is made on one qualifying quadrant of a patient's mouth, which must contain 12 surfaces of qualifying calculus (WREB Technical Report, 2020). The content area Extraoral and Intraoral Examination comprises two evaluation items (2 points total); Periodontal Assessment comprises four selected-response items (2 points each) and 15 periodontal probing and recession items (1 point each); and Calculus Removal and Tissue Management together comprise 12 items (6.25 points each), according to the WREB 2020 Dental Hygiene Examination Candidate Guide (WREB Candidate Guide, 2020).

WREB maintains a Dental Hygiene Committee that is responsible for development, review, and revision of the patient-based WREB Dental Hygiene Examination (WREB email communication, August 2020). The WREB Dental Hygiene Committee consists of six SMEs who are licensed dental hygienists and have served as a board member or a board designee from member states. At least one committee member is an educator from an accredited dental hygiene program. In addition, the committee is supported by two additional non-voting committee members and a professional psychometrician.

The Dental Hygiene Committee meets several times per year to evaluate psychometric data regarding the examination, review current dental hygiene practices and test specifications, and recommend exam development/revisions, when applicable (WREB email communication, August 2020). Any proposed changes to examination content are then reviewed and approved by a separate committee, the WREB Dental Hygiene Examination Review Board (HERB).

The HERB is an examination oversight body comprising representatives from each WREB member state, including the board chair and an educator-member (WREB email communication, August 2020). Additional (non-voting) members include the President of the WREB Board of Directors and two dental hygiene consultants in examination development and administration. The HERB meets annually to review the patient-based WREB Dental Hygiene Examination and approve any changes to examination content recommended by the Dental Hygiene Committee.

> Finding 11: The procedures used to develop and refine examination content included on the patient-based WREB Dental Hygiene Examination are generally consistent with professional guidelines and technical standards. However, the use of board members and educators is not fully compliant with OPES 20-01, as mandated by B&P Code § 139.

RECOMMENDATIONS

> Recommendation 4: OPES recognizes that WREB requires the participation of practitioners from member states to develop and administer examinations. In order to be fully compliant with OPES 20-01, OPES recommends phasing out or limiting the service of board members and educators during examination development processes.

CONCLUSIONS

Given the findings, the examination development activities conducted by WREB appear to be generally consistent with professional guidelines and technical standards with regard to development of examination content, to the linkage of examination content to the examination blueprint, and to the testing and review of examination performance. To reduce the potential for conflict of interest, OPES recommends phasing out the use of board members and educators as SMEs.

CHAPTER 4 | PASSING SCORES AND PASSING RATES

STANDARDS

The passing score of an examination is the score that represents the level of performance that divides those candidates for licensure who are minimally competent from those who are not competent.

The following standards are most relevant to passing scores, cut points, or cut scores for licensure examinations, as referenced in the *Standards.*

> **Standard 5.21**
>
> When proposed score interpretations involve one or more cut scores, the rationale and procedures used for establishing cut scores should be documented clearly (p. 107).
>
> **Standard 11.16**
>
> The level of performance required for passing a credentialing test should depend on the knowledge and skills necessary for credential-worthy performance in the occupation or profession and should not be adjusted to control the number or proportion of persons passing the test (p. 182).

The supporting commentary on passing or cut scores for Chapter 5 of the *Standards*, "Scores, Scales, Norms, Score Linking, and Cut Scores," states that the standard-setting process used should be clearly documented and defensible. The qualifications of the judges involved and the process of selecting them should be part of the documentation. A sufficiently large and representative group of judges should be involved, and care must be taken to ensure that judges understand the process and procedures they are to follow (p. 101).

In addition, the supporting commentary for Chapter 11 of the *Standards*, "Workplace Testing and Credentialing," states that the focus of tests used in credentialing is on "the standards of competence needed for effective performance (e.g., in licensure this refers to safe and effective performance in practice)" (p. 175). It further states, "Standards must be high enough to ensure that the public, employers, and government agencies are well served, but not so high as to be unreasonably limiting" (p. 176).

FINDINGS

Passing Scores – The Patient-Based WREB Dental Hygiene Examination: Process, Use of Subject Matter Experts, and Methodology

The passing score for the patient-based WREB Dental Hygiene Examination is set at 75 out of 100 possible points. OPES has advised that California boards avoid using absolute passing scores for licensure examinations and instead use a criterion-referenced passing score methodology that reflects the competencies required for practice. WREB recognizes the arbitrary nature of absolute passing scores in licensure examinations; however, some of WREB's member states have passing scores set in statute. Therefore, WREB has scaled the passing score of the patient-based WREB Dental Hygiene Examination using a criterion-based scoring system (WREB Technical Report, 2020).

To link the passing score to performance criteria, the Dental Hygiene Committee developed minimum competence performance definitions for each area of the examination, as well as definitions of performance above and below this level (WREB Technical Report, 2020). The Dental Hygiene Committee then determined a critical scoring criterion and assigned points based on minimum competence standards for each item on the examination.

> Finding 12: The use of a criterion-referenced passing standard to set the recommended passing score appears to be generally consistent with professional guidelines and technical standards.

Passing Rates

WREB tracks passing rates for individual states and provides annual reports that demonstrate how California candidates perform on examinations relative to all other candidates. This data is provided for first-time test takers, repeat test takers, and overall performance.

> Finding 13: For the years 2015–2020, passing rates for all California candidates consistently ranged from 90 to 93% (approximately). Passing rates for first time test takers consistently ranged from 90 to 94% (approximately). In the WREB Overview of Recent Results for Graduates of California Dental Hygiene Programs, 2020 (WREB Overview of Recent Results, 2020), WREB states that the high passing rates are to be expected "given candidates have been approved by their educational institution as ready to challenge a criterion-referenced clinical examination of minimum competence" (WREB Overview of Recent Results, 2020, p. 3). (Note: The patient-based WREB Dental Hygiene Examination was discontinued in early 2020 due to the COVID-19 pandemic. Therefore, 2020 results were based on only 212 candidates. However, the results for these candidates were consistent with those of prior years.)
>
> WREB has found that the likelihood of success decreases with the number of examination attempts. However, passing rates for all California candidates across attempts at the end of each of the examination seasons for the five years reviewed ranged from 99.2% to 99.8%.

Finding 14: WREB made an adjustment to scoring criteria in 2018 that resulted in a slight increase in the candidate passing rate. This adjustment is described further in Chapter 6. OPES supports this change in scoring criteria, which reduced sources of construct-irrelevant variance associated with radiographs and patient selection.

CONCLUSIONS

Given the findings, the passing score methodologies used by WREB to set the passing score for the patient-based WREB Dental Hygiene Examination demonstrate a sufficient degree of validity, thereby meeting professional guidelines and technical standards.

The passing rates for the patient-based WREB Dental Hygiene Examination indicate that California candidates perform exceptionally well. OPES concurs with WREB's assessment that the high passing rates may indicate that California candidates are receiving adequate training in education programs to prepare them for demonstrating minimum competence for practice.

CHAPTER 5 | TEST REGISTRATION AND ADMINISTRATION

STANDARDS

The following standards are most relevant to standardizing the test administration process for licensing examinations, as referenced in the *Standards.*

Standard 3.4

Test takers should receive comparable treatment during the test administration and scoring process (p. 65).

Standard 4.15

The directions for test administration should be presented with sufficient clarity so that it is possible for others to replicate the administration conditions under which the data on reliability, validity, and (where appropriate) norms were obtained. Allowable variations in administration procedures should be clearly described. The process for reviewing requests for additional testing variations should also be documented (p. 90).

Standard 4.16

The instructions presented to test takers should contain sufficient detail so that test takers can respond to a task in the manner that the test developer intended. When appropriate, sample materials, practice or sample questions, criteria for scoring, and a representative item identified with each item format or major area in the test's classification or domain should be provided to the test takers prior to the administration of the test or should be included in the testing material as part of the standard administration instructions (p. 90).

Standard 6.1

Test administrators should follow carefully the standardized procedures for administration and scoring specified by the test developer and any instructions from the test user (p. 114).

Standard 6.2

When formal procedures have been established for requesting and receiving accommodations, test takers should be informed of these procedures in advance of testing (p. 115).

Standard 6.3

Changes or disruptions to standardized test administration procedures or scoring should be documented and reported to the test user (p. 115).

Standard 6.4

The testing environment should furnish reasonable comfort with minimal distractions to avoid construct-irrelevant variance (p. 116).

Standard 6.5

Test takers should be provided appropriate instructions, practice, and other support necessary to reduce construct-irrelevant variance (p. 116).

Standard 8.1

Information about test content and purposes that is available to any test taker prior to testing should be available to all test takers. Shared information should be available free of charge and in accessible formats (p. 133).

Standard 8.2

Test takers should be provided in advance with as much information about the test, the testing process, the intended test use, test scoring criteria, testing policy, availability of accommodations, and confidentiality protection as is consistent with obtaining valid responses and making appropriate interpretations of test scores (p. 134).

FINDINGS

The WREB Dental Hygiene Examination is administered throughout the calendar year at test sites located in WREB's member states. Due to the COVID-19 pandemic, WREB temporarily suspended administration of the patient-based examination in 2020. However, WREB subsequently resumed testing on a limited basis through the end of 2020 and has indicated an intent to resume full administration in 2021.

WREB provides information about the patient-based WREB Dental Hygiene Examination to candidates and prospective candidates through its website at https://www.wreb.org.

Test Administration – Candidate Registration

Candidates register to take the WREB Dental Hygiene Examination by submitting an application and creating an online candidate profile. Candidates are required to submit a name that matches personal identification that must be provided the day of the examination. In addition, candidates are required to submit a photograph that will be used for their Candidate ID Badge, which must be worn the day of the examination.

The WREB website and 2020 WREB Candidate Guide provide detailed instructions and information regarding the application and registration process, including:

- Creating a Candidate Profile
- Scheduling requests
- Providing poof of qualification
- Paying for an examination
- Monitoring candidate status

Finding 15: WREB's registration process appears straightforward. The information available to candidates is detailed and comprehensive. The candidate registration process appears to meet professional guidelines and technical standards.

Test Administration – Accommodation Requests

WREB complies with the Americans with Disabilities Act and provides reasonable accommodations to candidates with documented disabilities. Candidates with a disability are required to submit a Special Accommodations Request Form 45 days prior to the examination, along with documentation from a health care professional attesting to the need for accommodation (WREB Candidate Guide, 2020). WREB attempts to make reasonable accommodations provided they do not interfere with the skills the examination is intended to measure or provide an unfair advantage (WREB Technical Report, 2020).

Finding 16: WREB's accommodation procedures appear consistent with professional guidelines and technical standards.

Test Administration – Test Centers and Test Sites

The WREB Dental Hygiene Examination is administered over several days at dental hygiene schools that serve as test sites. These test sites are located throughout California and other member states (WREB website). Testing dates are site-specific and arranged between WREB and the test site. Candidates are assigned to either a morning or afternoon testing session (WREB Candidate Guide, 2020).

Finding 17: Candidates have access to participating dental hygiene schools with trained examiners and controlled testing conditions.

Test Administration – Directions and Instructions to Candidates

The WREB website provides detailed information about the patient-based WREB Dental Hygiene Examination. In addition, the 2020 WREB Candidate Guide provides detailed information to candidates regarding:

- Scope of the examination and examination procedures
- Examination materials and instruments
- Patient selection guidelines
- Reporting to the test center and test site
- Candidate orientation
- Test center and test site procedures
- Security procedures
- Standards of conduct
- Infection control requirements
- Examination scoring criteria
- Examination forms (completed before, or during, examination administration)

Candidates are also provided with an onsite question and answer session and tour of the clinic before the start of the exam. During this time, candidates are provided with instructions regarding clinic layout, emergency protocols, infection control policies, proper disposal of biohazardous materials, sterilization procedures, and operation of equipment (WREB Candidate Guide, 2020).

> Finding 18: The directions and instructions provided to candidates appear straightforward. The information available to candidates is detailed and comprehensive.

Test Administration – Standardized Procedures and Testing Environment

Candidates are tested in similar operatories at test sites, using the same equipment, under the same conditions (WREB Candidate Guide, 2020). All candidates are assessed on the same clinical skills, which are performed on a live patient in a clinical setting. All candidates are required to use the same specified set of instruments during the examination process. In addition, expendable dental hygiene materials are provided by test sites to all candidates. Candidates are required to provide protective eyewear for themselves and patients.

As part of the examination process, candidates are required to submit live patients for acceptance and approval. Patients must meet specific criteria, including one quadrant with 12 surfaces of minimum qualifying subgingival calculus (WREB Candidate Guide, 2020). While candidates incur point penalties for patient rejections, they may make up to three submissions for acceptance.

> Finding 19: The procedures established for the test administration process and testing environment appear to be consistent with professional guidelines and technical standards.

Finding 20: The variability associated with the use of live patients presents challenges to standardization. WREB is aware of these challenges and has taken steps to address the issue. WREB evaluated candidate performance between 2013 and 2017 and found that candidates who submitted patients that required “more challenging treatment” were less likely to incur penalties for patient rejection. However, these candidates were less likely to be successful on the treatment portion of the examination. In 2018, WREB revised the patient selection process, allowing candidates to submit up to four additional teeth in addition to a quadrant, without necessarily having to treat all submitted teeth. The modifications made in 2018 also included changes in the definitions of qualifying calculus to “improve clarity and better reflect the treatment needs of the wider patient population” (WREB Overview of Recent Results, 2020, p. 2).

While the revisions made in 2018 resulted in an increase in passing rates, it is unclear to what extent standardization was improved. WREB has defined criteria for minimum qualifying calculus; however, it is unclear how increased levels of complexity are accounted for with regard to minimum competence standards. While the level of complexity associated with calculus removal appears to vary significantly when using live patients, scoring is dichotomous (points are assigned based on the presence or absence of remaining calculus).

WREB has been researching the viability of alternatives to patient-based assessments, including a typodont simulation using custom-designed materials. However, WREB has found that a typodont simulation would not be a sufficiently valid and defensible alternative. WREB has indicated it will continue exploring the simulation alternatives as more realistic simulations can be demonstrated.

RECOMMENDATIONS

Recommendation 5: OPES recognizes the standardization challenges associated with candidate submissions of live patients. However, standardization is an essential feature in administering examinations that are legally defensible, valid, and fair to candidates. OPES recommends that WREB continue to investigate new technologies and alternate means of assessing candidate skills as they relate to competence to practice as a dental hygienist.

CONCLUSIONS

Given the findings, the test administration protocols put in place by WREB appear consistent with professional guidelines and technical standards. However, OPES recommends options be considered to address standardization issues associated with the use of live patients.

CHAPTER 6 | EXAMINER TRAINING, SCORING, AND PERFORMANCE STANDARDS

STANDARDS

The following standards are most relevant to examiner training, test scoring, and performance for licensing examinations, as referenced in the *Standards.*

Standard 2.3

For each total score, subscore, or combination of scores that is to be interpreted, estimates of relevant indices of reliability/precision should be reported (p. 43).

Standard 4.10

When a test developer evaluates the psychometric properties of items, the model used for that purpose (e.g., classical test theory, item response theory, or another model) should be documented. The sample used for estimating item properties should be described and should be of adequate size and diversity for the procedure. The process by which items are screened and the data used for screening, such as item difficulty, item discrimination, or differential item functioning (DIF) for major examinee groups, should also be documented. When model-based methods (e.g., IRT) are used to estimate item parameters in test development, the item response model, estimation procedures, and evidence of model fit should be documented (pp. 88-89).

Standard 4.20

The process for selecting, training, qualifying, and monitoring scorers should be specified by the test developer. The training materials, such as the scoring rubrics and examples of test takers' responses that illustrate the levels on the rubric score scale, and the procedures for training scorers should result in a degree of accuracy and agreement among scorers that allows the scores to be interpreted as originally intended by the test developer. Specifications should also describe processes for assessing scorer consistency and potential drift over time in raters' scoring (p. 92).

Standard 4.21

When test users are responsible for scoring and scoring requires scorer judgment, the test user is responsible for providing adequate training and instruction to the scorers and for examining scorer agreement and accuracy. The test developer should document the expected level of scorer agreement and accuracy and should provide as much technical guidance as possible to aid test users in satisfying this standard (p. 92).

Standard 6.8

Those responsible for test scoring should establish scoring protocols. Test scoring that involves human judgment should include rubrics, procedures, and criteria for scoring. When scoring of complex responses is done by computer, the accuracy of the algorithm and processes should be documented (p. 118).

OPES 20-01, as mandated by B&P Code § 139, specifies that board members, committee members, and instructors should not serve as expert consultants in the licensure examination development process. This is due to potential conflict of interest, undue influence, and security considerations.

FINDINGS

Examiner Selection and Training

The patient-based WREB Dental Hygiene Examination relies on the judgment of examiners in determining whether a candidate has demonstrated the skills required for competent dental hygiene practice. The Dental Hygiene Committee sets the criteria for selecting examiners (WREB Technical Report, 2020). Examiners are predominantly members or designees of licensing boards that comprise WREB's member states. Approximately 25% of examiners are educators. All examiners are required to be actively licensed and in good standing and have no license restrictions. They must submit proof of license renewal each year (WREB Technical Report, 2020).

All examiners are required to complete a series of tutorials and self-assessments in preparation for scoring examinations (WREB Technical Report, 2020). Examiners review WREB secure online training materials and then attend orientation and calibration sessions. During these sessions, examiners practice applying scoring criteria using examples of clinical performance. The judgments provided by examiners during these sessions are compared with scores provided by members of examination committees using the performance criteria. Calibration exercises are continued until examiners reach an acceptable level of agreement.

The Dental Hygiene Committee also monitors examiner performance during examinations (WREB Technical Report, 2020). Examiners who demonstrate low percentages of agreement, high percentages of harshness or lenience, or erratic grading patterns receive remedial training and are monitored for proper application of grading criteria definitions. Continued lack of agreement may result in dismissal from the examination pool (WREB Technical Report, 2020).

WREB maintains a statistical profile of examiners, which is used as the basis for assigning examiners to test sites (WREB Technical Report, 2020). Site assignments are made to provide stability in grading across examiners and examination administrations. To minimize conflicts of interest, educators are not allowed to serve as examiners at the school test site where they teach (WREB Technical Report, 2020). WREB requires that member states be involved in examination development and administration, and examiners from member states are prioritized in making examiner assignments at test sites.

Finding 21: The selection and training of examiners for the patient-based WREB Dental Hygiene Examination is generally consistent with professional guidelines and technical standards. However, the use of board members and educators as examiners is not fully compliant with OPES 20-01, as mandated by B&P Code § 139.

Examination Scoring

The patient-based WREB Dental Hygiene Examination uses a criterion-based scoring system (WREB Technical Report, 2020). Once a candidate has completed treatment procedures on a patient, three examiners independently evaluate the candidate's performance using established scoring criteria. Scores are assigned based on the median rating of the three examiners.

Points on the examination are deducted for patient selections that do not meet required criteria and for performance errors that are confirmed by two of three examiners (WREB Technical Report, 2020). Point deductions for rejection and performance errors are assigned as follows:

- Patient treatment submission rejection – 4 points each (up to three rejections).
- Extraoral and intraoral examination – 2 points (partial credit of one point may be given).
- Probing and recession error – 1 point each (up to 12 out of 15 possible points).
- Remaining calculus – 6.25 points each.
- Tissue trauma – 6.50 points each (WREB Candidate Guide, 2020).

In addition to point penalties for performance errors, candidates are assessed a 4-point or 3-minute clinical treatment time deduction for each minute a patient is late for check-in procedures, and a 1-point deduction for each minute the patient is late for check-out procedures (WREB Candidate Guide, 2020).

A final score is calculated by applying point deductions from a total of 100 possible points (WREB Technical Report, 2020). Candidates must receive a minimum score of 75 of 100 possible points to pass the examination.

Finding 22: The scoring criteria are applied equitably and are generally consistent with professional guidelines and technical standards.

Finding 23: Scoring penalties predominantly reflect errors or deficiencies associated with performance. However, the late penalty appears to be unrelated to performance standards required for safe and effective practice.

Finding 24: A scoring penalty of 6.25 points is assigned for the presence of detectable calculus. This scoring is dichotomous and appears to be assigned irrespective of the level of case complexity.

Examination Performance

WREB performs analyses of test functioning and rater performance for each examination administration (WREB Technical Report, 2020). Classical test theory statistics are used to evaluate rating scale proportions and descriptive statistics of rated examination components. The many-faceted Rasch model is also used to evaluate performance characteristics associated with candidate ability, task difficulty, and scoring (WREB Technical Report, 2020).

Following each examination administration, WREB performs several analyses to evaluate examiner rating performance. These analyses include evaluation of both examiner agreement and examiner harshness or leniency (WREB Technical Report, 2020). To evaluate rater agreement, WREB conducts comparison analyses between ratings assigned by one examiner and the mean of the ratings provided by the other two examiners for each examination component (WREB Technical Report, 2020). Ratings that deviate from the mean by one point represent an insufficient level of agreement. WREB examiners are expected to be within one point of the mean in at least 80% of assigned ratings (WREB Technical Report, 2020).

Infit and outfit mean-square fit statistics (many-faceted Rasch model) are analyzed to identify examiner ratings that indicate either harsh or lenient extremes. Examiners with ratings at extremes of either range may be referred for additional training (WREB Technical Report, 2020). Additional analyses of examiner teams at each test site are conducted using the Rasch model to ensure comparability of ratings across examination sites and sessions (WREB Technical Report, 2020).

Data provided for the most recent complete administration of the patient-based WREB Dental Hygiene Examination (2019) indicated examination and examiner statistics within generally accepted ranges.

> Finding 25: The examination-level statistics and examiner performance statistics indicate adequate performance for licensure examinations.

RECOMMENDATIONS

> Recommendation 6: OPES recognizes that WREB requires the participation of practitioners from member states to develop and administer examinations. In order to be fully compliant with OPES 20-01, OPES recommends phasing out the service of board members and educators as examiners in the administration of the patient-based WREB Dental Hygiene Examination.
>
> Recommendation 7: The content and scoring criteria for licensure examinations should clearly reflect the competencies necessary for practice. The scoring criteria used on the patient-based WREB Dental Hygiene Examination generally reflect the competencies required for dental hygiene practice, with penalties for performance error or critical deficiencies. However, the time penalty appears unrelated to competency for practice. OPES recommends reviewing scoring criteria to define how this penalty relates to the competencies required for practice or removing this penalty from the scoring process.

Recommendation 8: In 2018, WREB modified patient submission criteria. As WREB noted, candidates who selected more challenging cases were less likely to face patient rejection but were more likely to be unsuccessful on treatment portions of the examination (WREB Overview of Recent Results, 2020). It is unclear whether more challenging cases reflect minimum competence for professional practice or are associated with higher levels of competence. OPES recommends that WREB clarify the relationship between case complexity and minimum competence standards.

CONCLUSIONS

The steps taken by WREB to score the patient-based WREB Dental Hygiene Examination generally appear to provide for a fair and objective evaluation of candidate performance. However, OPES recommends that WREB review scoring criteria to establish a clear connection between the time penalty and competence for dental hygiene practice or that WREB consider revision of this penalty. OPES further recommends that WREB clarify the link between case complexity and minimum competence with regard to dichotomous scoring of calculus removal.

The steps taken by WREB to evaluate examination and examiner performance appear to be reasonable.

CHAPTER 7 | TEST SECURITY

STANDARDS

The following standards are most relevant to test security for licensure examinations, as referenced in the *Standards.*

Standard 6.6

Reasonable efforts should be made to ensure the integrity of test scores by eliminating opportunities for test takers to attain scores by fraudulent or deceptive means (p. 116).

Standard 6.7

Test users have the responsibility of protecting the security of test materials at all times (p. 117).

Standard 8.9

Test takers should be made aware that having someone else take the test for them, disclosing confidential test material, or engaging in any other form of cheating is unacceptable and that such behavior may result in sanctions (p. 136).

Standard 9.21

Test users have the responsibility to protect the security of tests, including that of previous editions (p. 147).

FINDINGS

Test Security – Examination Materials and Candidate Information

For the patient-based WREB Dental Hygiene Examination, the content, scoring criteria, and passing score are made public and are available in the 2020 WREB Candidate Guide.

All examination materials and equipment used to administer the examination are prepared by WREB staff for distribution to test sites before the date of administration (WREB email communication, November 2020). Materials and scoring equipment are individually numbered and securely sealed in containers for transport to test sites. Each container is assigned a unique identifier and securely shipped to a test site using a national shipping company. At each test site, the containers are verified and stored in a locked room. Only WREB staff have access to and authority to unseal the containers. Once the containers are opened, WREB staff use point keyed locks throughout examination processes. Following test administration, WREB staff securely seal examination materials and equipment in the containers for return shipping.

During the registration process, candidates are required to submit a passport quality photograph (WREB email communication, November 2020). This photograph becomes part of the

Candidate Profile and is printed on the Candidate ID Badge. This badge must be presented by a candidate at the examination site, along with another valid form of identification, before the candidate will be admitted. All examination materials are numbered with each candidate's unique Candidate ID Number. Candidates are required to wear the Candidate ID Badge throughout the examination, and each candidate's materials are matched against each Candidate ID Badge for accuracy. Candidates must return their ID Badge and examination materials at the completion of the exam.

All examiners and candidates are required to sign non-disclosure agreements, certifying confidentiality compliance regarding examination-related materials (WREB Technical Report, 2020). Candidate are permitted to bring the 2020 WREB Candidate Guide to test sites, but all other outside references or materials are prohibited. In addition, candidates are prohibited from bringing recording devices, cell phones, smartwatches, or other electronic devices into test sites. Candidate clothing and eyeglasses are inspected on the day of the examination for prohibited items (WREB Technical Report, 2020).

At test sites, WREB uses dedicated equipment and a secure electronic scoring system (ESS) to maintain the security of candidate information and examination data (WREB email communication, November 2020). The ESS requires a uniquely encrypted key for access, and it is used to transmit scoring data from examiner electronic devices to an onsite server via a secure local network. The network can only be accessed by WREB staff. Each day, designated WREB staff synch information used during examination administration from the WREB office, and synch data back at the end of the day.

The WREB server is equipped with backup capability. In addition, WREB staff use an external USB hard drive to prevent catastrophic ESS data loss.

> Finding 26: The security procedures practiced by WREB with regard to the maintenance of examination materials and candidate information are consistent with professional guidelines and technical standards.

Test Security – Test Sites

WREB maintains test site security policies and procedures. Only authorized WREB personnel, examiners, and candidates are allowed to access test facilities providing test administration. WREB personnel, examiners, and candidates are required to wear identification at all times during test administration.

Finding 27: The security procedures practiced by WREB regarding test sites are consistent with professional guidelines and technical standards.

CONCLUSIONS

Given the findings, the test security policies, procedures, and protocols meet professional guidelines and technical standards.

CHAPTER 8 | COMPARISON OF THE CALIFORNIA REGISTERED DENTAL HYGIENIST DESCRIPTION OF PRACTICE TO THE PATIENT-BASED WREB DENTAL HYGIENE EXAMINATION BLUEPRINT

PARTICIPATION OF SUBJECT MATTER EXPERTS

OPES convened a 2-day workshop on May 14–15, 2020 to evaluate and compare the following items:

- The task and knowledge statements of the California description of practice resulting from the 2019 California Occupational Analysis of the Registered Dental Hygienist Profession (California RDH OA, 2019).
- The examination content of the patient-based WREB Dental Hygiene Examination.

OPES recruited seven registered dental hygienists to participate in the workshop as SMEs.

The SMEs represented the profession in both northern and southern California. Two of the SMEs had been licensed for 1–5 years, one had been licensed for 6–10 years, three had been licensed for 11–19 years, and one had been licensed for more than 20 years. All SMEs worked as dental hygienists in various settings.

WORKSHOP PROCESS

First, the SMEs completed OPES' security agreement, self-certification, secure area agreement, and personal data (demographic) forms. The OPES facilitator explained the importance of, and the guidelines for, security during and outside the workshop. The SMEs were then asked to introduce themselves.

Next, the OPES facilitator gave a PowerPoint presentation about the purpose and importance of occupational analysis, validity, content validity, reliability, test administration standards, examination security, and the role of SMEs. The OPES facilitator also explained the purpose of the workshop.

The SMEs were instructed to evaluate and link each task and knowledge statement of the California description of practice to the task statements of the patient-based WREB Dental Hygiene Examination blueprint. The SMEs worked as a group to evaluate and link all of the task and knowledge statements of the California description of practice.

The content domain of the patient-based WREB Dental Hygiene Examination is provided in Table 1. Table 2 provides the content areas of the 2019 California RDH description of practice.

TABLE 1 – PATIENT-BASED WREB DENTAL HYGIENE EXAMINATION BLUEPRINT DOMAIN SECTIONS

Domain Section	Weight
1. Extraoral and Intraoral Examination	25%
2. Periodontal Assessment	
3. Calculus Removal	75%
4. Tissue Management	
Total	**100%**

TABLE 2 – CONTENT AREAS OF THE 2019 CALIFORNIA REGISTERED DENTAL HYGIENIST DESCRIPTION OF PRACTICE

Content Area	Content Area Description	Weight
1. Treatment Preparation	This area assesses the candidate's knowledge of preparing the operatory and patient dental hygiene services.	5%
2. Dental Hygiene Treatment	This area assesses the candidate's knowledge of completing a comprehensive oral health assessment, dental hygiene treatment planning, and dental hygiene treatment.	40%
3. Patient Education	This area assesses the candidate's knowledge of educating patients regarding oral health and individualized oral hygiene instructions.	10%
4. Infection Control	This area assesses the candidate's knowledge of maintaining a safe and clean work environment and adhering to infection control protocols and standard precautions.	15%
5. Documentation	This area assesses the candidate's knowledge of documenting patient oral health status, procedures performed, and updating patient dental records.	5%
6. Laws, Regulations, and Ethics	This area assesses the candidate's knowledge of licensing requirements, professional conduct, patient confidentiality, use of telehealth methods and technology, and mandated reporting.	25%
Total		**100%**

FINDINGS

The SMEs compared the task and knowledge statements of the 2019 California RDH description of practice outline and the patient-based WREB Dental Hygiene Examination blueprint. The SMEs concluded that the patient-based WREB Dental Hygiene Examination adequately assessed the skills required for entry-level dental hygiene practice in California in the following four areas:

- Treatment Preparation
- Dental Hygiene Treatment
- Infection Control
- Documentation

The SMEs indicated that the patient-based WREB Dental Hygiene Examination did not adequately assess the content area Patient Education, but this content was determined to be adequately assessed by other assessment measures. In addition, SMEs indicated that the patient-based WREB Dental Hygiene Examination did not adequately assess the content area Laws, Regulations, and Ethics. However, this content is measured by the California-specific Registered Dental Hygienist Law and Ethics Examination.

> Finding 28: The SMEs concluded that the content of the patient-based WREB Dental Hygiene Examination adequately assesses the general skills required for entry-level dental hygiene practice in California identified in the California RDH OA, 2019.
>
> Finding 29: The SMEs concluded that the content of the patient-based WREB Dental Hygiene Examination does not adequately assess the laws and ethics required for practice in California. SMEs concluded that this content should continue to be measured using a California-specific law and ethics examination.

CONCLUSIONS

Overall, the SMEs concluded that the content of the patient-based WREB Dental Hygiene Examination sufficiently assesses the skills dental hygienists are expected to have mastered at the time of licensure.

CHAPTER 9 | CONCLUSIONS

COMPREHENSIVE REVIEW OF THE PATIENT-BASED WREB DENTAL HYGIENE EXAMINATION

OPES completed a comprehensive analysis and evaluation of the documents provided by WREB.

OPES finds that the procedures used to establish and support the validity and defensibility of the patient-based WREB Dental Hygiene Examination (i.e., OA, examination development, passing scores and passing rates, test registration and administration, examination scoring and performance, and test security) *generally* meet professional guidelines and technical standards outlined in the *Standards* and B&P Code § 139. However, to be fully compliant with OPES 20-01, OPES recommends phasing out the service of board members and educators in examination development processes.

In addition, OPES made recommendations related to standardization and scoring processes. These recommendations are as follows:

1) OPES recommends that WREB consider methods to improve standardization in relation to patient selection. The use of live patients in licensure examinations presents challenges to standardization; however, standardization is an essential feature of examinations that are legally defensible, valid, and fair. WREB regularly reviews the performance of the WREB Dental Hygiene Examination and takes steps to maximize standardization; however, it appears that there may be some variability with regard to patient presentation and case complexity. WREB has defined a minimum qualifying calculus standard associated with minimum competence, but it is unclear how higher levels of complexity are addressed. Scoring on calculus removal is dichotomous, regardless of case complexity. OPES recommends that WREB review the patient selection component of the examination and provide a clear connection between scoring criteria, case complexity, and minimum competence.

2) OPES recommends that WREB review the scoring deductions associated with late arrival penalties. Scoring criteria should be directly related to the competencies required for practice and should not reflect undesirable behaviors that are not related to professional competencies. Therefore, OPES recommends that WREB review the late penalty deduction. This penalty should be revised, or a connection should be established between this penalty and minimum competence.

   OPES notes that WREB regularly evaluates the contribution of these penalties to overall passing rates. WREB has indicated that these penalties rarely result in a candidate failing the examination; however, both patient rejections and late penalties remain a significant contributor to point deductions. They also may create unnecessary stress for candidates.

Based on the evaluations presented in this report, OPES finds that the content of the patient-based WREB Dental Hygiene Examination *generally* measures the skills related to California dental hygiene practice.

However, practical examinations typically face issues with one or more of the following: standardizing procedures and materials, inter-rater reliability, validating scoring criteria, and setting passing scores that reflect minimum competence. These issues are exacerbated by the addition of live patients. OPES recommends that the Board consider conducting an evaluation to determine whether a skills-based examination remains a necessary component of assessing a candidate's competence for practice. Given the level of training and clinical assessment that dental hygiene candidates receive in educational programs, requiring a knowledge-based examination may be sufficient to assess minimum competence for licensure.

CHAPTER 10 | REFERENCES

American Educational Research Association, American Psychological Association, National Council on Measurement in Education, and Joint Committee on Standards for Educational and Psychological Testing. (2014). *Standards for educational and psychological testing*.

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Agenda Item 4

Future Agenda Items.

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Agenda Item 5

Adjournment.