



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





DENTAL BOARD OF CALIFORNIA

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This report is mandated by California Business and Professions Code (BPC) § 139 and by  
*DCA Licensure Examination Validation Policy OPES 22-01*.

## 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 dentist in California, a candidate must have the requisite education and experience and pass the following three examinations:

1. Integrated National Board Dental Examination (INBDE)
2. American Board of Dental Examiners (ADEX)
3. California Dentist Law and Ethics Examination (LEX)

The Dental Board of California (Board) requested that DCA's Office of Professional Examination Services (OPES) complete a comprehensive review of the Integrated National Board Dental Examination (INBDE), which is developed by the Joint Commission on National Dental Examinations (JCNDE) and administered by Prometric Inc. OPES performed this review to evaluate the suitability of the examination for use in California licensure of dentists. The examination is used by all 50 states and some territories.

The INBDE requires candidates to demonstrate the knowledge necessary to practice dentistry safely and within the dentistry scope of practice. JCNDE has researched and validated the examination to ensure that the competencies required for entry level practice are measured.

OPES, in collaboration with the Board, received and reviewed a report provided by JCNDE. The report included information on the occupational analysis (OA) conducted in 2016 addressing the practices and procedures used to develop and validate the INBDE. In addition, OPES reviewed other reports and documents provided by JCNDE. OPES performed a comprehensive evaluation of the documents to determine whether the following INBDE components met professional guidelines and technical standards: (a) OA, (b) examination development and scoring, (c) passing scores and passing rates, (d) test administration and score reporting, and (e) 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 appear to meet professional guidelines and technical standards outlined in the *Standards for Educational and Psychological Testing (2014 Standards)* and in California Business and Professions (BPC) § 139. However, to fully comply with BPC § 139 and related DCA Policy OPES 20-01 *Participation in Examination Development Workshops (Policy OPES 20-01)*, OPES recommends phasing out the service of instructors in examination development processes.

In addition to reviewing documents provided by JCNDE, OPES convened a linkage workshop of licensed California dentists in January 2023. The dentists served as subject matter experts (SMEs) to review the content of the INBDE. The SMEs were selected to represent the profession in terms of geographic location and experience. The purpose of the review was to link the INBDE content outline with the California description of practice that resulted from the *Occupational Analysis of the Dentist Profession in California* conducted by OPES in 2018 (*2018 California OA*). During this workshop, the SMEs linked the tasks and knowledge statements from the California description of practice to the content outline of the INBDE

The results of the linkage study indicated that the content of the INBDE adequately assesses the knowledge required for competent entry level practice of dentists in California. The INBDE did not assess practical demonstration of skills and California-specific laws and ethical guidelines.

Given the findings, OPES supports the Board's continued use of the INBDE, in addition to the ADEX and LEX, for licensure in California.

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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 practice safely and competently in California.

The Dental Board of California (Board) requested that DCA's Office of Professional Examination Services (OPES) complete a comprehensive review of the Integrated National Board Dental Examination (INBDE) developed and administered by the Joint Commission on National Dental Examinations (JCNDE).

The INBDE is a multiple-choice national examination that measures a candidate's clinical knowledge associated with entry level dental practice. The INBDE stated purpose is to measure the "candidate's ability to apply knowledge of biomedical, clinical, and behavioral sciences along with cognitive skills to understand and solve problems in clinical and professional contexts." The INBDE is administered over two days and is ten and a half hours long. There are 400 scorable items and 100 pretest items. The examination is administered in six 105-minute sections to allow candidates breaks between sections based in 10 foundation knowledge areas.

The OPES review had three purposes:

1. To evaluate the suitability of the INBDE for continued use in California.
2. To determine whether the INBDE meets the professional guidelines and technical standards outlined in the *Standards for Educational and Psychological Testing (2014 Standards)* and in California Business and Professions Code (BPC) § 139.
3. To identify any areas of California practice that the INBDE does not assess.

OPES recognizes that evaluating the suitability of the INBDE involves complex analysis. As noted in the *Standards* (p. 7):

Evaluating the acceptability of a test does not rest on the literal satisfaction of every standard ... and the acceptability of a test or test

application cannot be determined by using a checklist. Specific circumstances affect the importance of individual standards, and 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 JCNDE to determine whether the following examination program components met professional guidelines and technical standards outlined in the *2014 Standards* and BPC § 139: (a) occupational analysis (OA),<sup>1</sup> (b) examination development and scoring, (c) passing scores<sup>2</sup> and passing rates, (d) test administration and score reporting, and (e) test security procedures.

OPES' evaluation of INBDE is based solely on its review of the documentation provided by JCNDE. OPES did not seek to independently verify the claims and statements made by JCNDE.

## CALIFORNIA LAW AND POLICY

BPC § 139 states:

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

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<sup>1</sup> An occupational analysis is also known as a job analysis, practice analysis, or task analysis. For clarity and consistency, this report uses the term "occupational analysis" to refer to the type of analysis that supports the claim that an examination assesses the skills and knowledge required for safe and effective practice at entry level (*Standards*).

<sup>2</sup> A passing score is also known as a pass point or cut score.

BPC § 139 further requires that DCA develop a policy to address the minimum requirements for psychometrically sound examination validation, examination development, and OAs, including standards for the review of state and national examinations.

DCA *Policy 22-01 Examination Validation (Policy OPES 22-01)* specifies the *2014 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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## CHAPTER 2 | OCCUPATIONAL ANALYSIS

Unless otherwise noted, the source for the information in this chapter is the *2021 JCNDE INBDE Technical Report* and the additional information provided by JCNDE.

### OCCUPATIONAL ANALYSIS STANDARDS

The following standard is most relevant to conducting OAs for licensure examinations, as referenced in the *2014 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 to 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).

BPC § 139 requires that each California licensure board, bureau, and program report annually on the frequency of its OA and the validation and development of its examinations. *Policy OPES 22-01* 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/description of practice 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).

## OCCUPATIONAL ANALYSIS DESCRIPTION, PURPOSE, AND TIME FRAME

In 2016, JCNDE began an OA of the dentistry profession, and the results were documented in the *INBDE Technical Report (2021 INBDE Technical Report)*. Additional information about this study was obtained through documentation provided by JCNDE, from JCNDE's website, and through email communication with JCNDE representatives.

The purpose of the 2016 OA was to define the practice of dentists in terms of the tasks performed by entry level practitioners and the associated knowledge needed to perform those tasks. JCNDE began by reviewing references and researching the competencies required for dentists. JCNDE uses a broad and comprehensive model whereby content domains are periodically updated. JCNDE is in the process of developing a new set of tasks and knowledge statements.

JCNDE began developing its Domain of Dentistry in 2010. The process was facilitated by psychometricians and involved dentists serving as subject matter experts (SMEs). The SMEs were carefully selected by JCNDE based on their professional and industry experience, background, and geographic location.

In 2011, JCNDE established statements describing the major tasks and activities required for the safe, independent practice of dentistry by entry level practitioners, across all areas of general practice in the dental clinic, with 10 foundation knowledge areas. Two separate panels comprised of 7 and 18 SMEs, respectively, were convened to evaluate the clinical content areas. The first group was selected for their expertise in specific content areas, while the second group was comprised of all dentists with exactly 5 years of experience. Both of the panels' evaluations supported the use of the 65 clinical content areas and foundation knowledge areas.

In 2015, JCNDE convened a new SME panel to reevaluate the statements developed in 2011. This panel revised the 65 statements, resulting in 56 clinical content areas. A survey was then sent to 2,219 dentists of which 166 responded. The results supported the 56 clinical content areas, and they were subsequently finalized.

**Finding 1:** The most recent development of tasks and knowledge was completed in 2016. The timeframe for the development of tasks and knowledge is considered to be current and legally defensible. JCNDE is currently working on a new occupational analysis, and they expect to finalize it in 2024.

#### OCCUPATIONAL ANALYSIS SURVEYS, SAMPLING PLAN AND RESPONSE RATE

JCNDE sent surveys throughout the process to SMEs evaluating the content areas as they moved through the development cycle. These surveys evaluated the frequency and importance of each content area as it relates to the field of dentistry.

In 2011, JCNDE sent a survey to dentists to gather feedback on the 65 content areas developed by the JCNDE. More than 700 dentists responded to the survey. A statistical model was applied to the importance and frequency results and supported the use of all 65 content areas.

In subsequent reviews between 2011 and 2016, the 65 content areas were narrowed down to 56. A new survey for the 56 content areas was sent to 2,219 dentists of which 166 individuals responded. This survey gathered feedback on the relevance and comprehensiveness of the revised list. The survey results supported the change to 56 content areas.

In 2016, JCNDE sent a survey to 34,441 dentists with 10 or less years of experience. The survey evaluated the 56 clinical content areas with respect to importance and frequency. The survey was completed by 4,431 dentists. California practitioners accounted for approximately 9% of the respondents.

**Finding 2:** The procedures used by JCNDE to develop the surveys and periodically update the content areas are generally consistent with professional guidelines and technical standards.

**Recommendation 1:** OPES recommends that JCNDE include practitioners licensed 5 years or less in subsequent OA development processes.

**Recommendation 2:** OPES recommends that JCNDE increase the frequency with which it conducts its OA. *Policy OPES 22-01* specifies that an OA should be conducted every 5 years.

## OCCUPATIONAL ANALYSIS – DEVELOPMENT OF EXAMINATION OUTLINE

The process of examination development and the development of tasks and knowledge statements is continuous for the INBDE. At each phase of development, SMEs are encouraged to critically evaluate the examination outline for areas that are not addressed or are addressed and should not be. Though this evaluation is ongoing, it does not result in a large number of substantive changes due to the stability of the scope of skill and knowledge required for the safe and effective practice of dentistry.

In 2010, the JCNDE developed 65 statements that describe the major tasks and activities required for the safe, independent practice of dentistry by entry level practitioners, across all areas of general practice in the dental clinic. These clinical content areas were formulated and adapted based on competencies and standards presented in previous reports. The initial statements were subsequently evaluated and revised with the input of SMEs. The resulting 56 content areas were then evaluated by a survey of dentists regarding their importance and frequency.

**Finding 3:** The processes used to establish a link between tasks and knowledge identified by the OA as required for entry level practice and the examination outline demonstrate a minimum level of validity.

## CONCLUSIONS

The OA and the development of the test specifications for the INBDE, based on the results of the most recent OA, appear consistent with professional guidelines and technical standards. OPES recommends that the OA committee take steps to include SMEs who represent the practice in terms of all experience levels. Because the results of the OA form the basis of the INBDE, entry level practitioners (licensed 5 years or less) should be involved in these processes.



## CHAPTER 3 | EXAMINATION DEVELOPMENT AND SCORING

Unless otherwise noted, the source for the information in this chapter is the *2021 JCNDE INBDE Technical Report* and the additional information provided by JCNDE.

### EXAMINATION DEVELOPMENT STANDARDS

Examination development includes many steps, 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 developing examination content, linking 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 *2014 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 4.7**

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

#### **Standard 4.10**

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 4.12**

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

#### **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).

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

BPC § 139 requires DCA to develop a policy on examination validation which includes minimum requirements for psychometrically sound examination development.

*DCA Policy OPES 20-01 Participation in Examination Development Workshops (Policy OPES 20-01)*, as mandated by BPC § 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.

## EXAMINATION DEVELOPMENT – PARTICIPATION OF SUBJECT MATTER EXPERTS

Examination development for the INBDE is performed by SMEs who serve on the Examination Review Committees for JCNDE's theory examinations. SMEs were carefully selected by JCNDE based on their professional and industry experience and background. Each writing and review panel has 16 SMEs. The group is made up of specialists in different domains of dentistry. Each subgroup has between 5 and 6 SMEs. One SME in each group is a general dentist and the remainder are experts in prescribed foundation knowledge areas. JCNDE allows educators to participate in examination development. All SMEs who participate in examination development are required to sign JCNDE's security agreement.

**Finding 4:** The criteria used to select SMEs appear relatively consistent with professional guidelines and technical standards. However, including the service of educators in examination development processes is not fully compliant with *Policy OPES 20-01*, as mandated by BPC § 139.

**Recommendation 3:** To be fully compliant with *Policy OPES 20-01*, OPES recommends phasing out or limiting the service of educators during examination development processes.

## EXAMINATION DEVELOPMENT – LINKAGE TO EXAMINATION CONTENT OUTLINES

All items are linked to the examination content outlines by a panel of SMEs. Linkages are then confirmed by the SMEs on the Examination Review Committees.

**Finding 5:** The methods used to establish a link between examination content and the competencies necessary for entry level practice appear consistent with professional guidelines and technical standards.

## EXAMINATION DEVELOPMENT – ITEM DEVELOPMENT AND PRETESTING

As item writers, SMEs are provided a document on the principles of item writing, and guidelines on cognitive levels. They are also provided item writing guidelines by JCNDE. SMEs are asked to review the content specifications to ensure a clear linkage between the items and the examination content outlines.

New items are reviewed by SMEs on the Examination Review Committee during item review meetings. In addition, new items are included on 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 JCNDE staff to determine whether the items meet criteria for inclusion on future examination forms. In evaluating item performance, JCNDE staff consider indices of both item difficulty and item discrimination. Items that do not meet defined performance criteria are returned for revision or are eliminated. OPES reviewed item level performance data and the item performance criteria provided by JCNDE.

**Finding 6:** The procedures used to develop, review, and pretest new items appear consistent with professional guidelines and technical standards.

#### EXAMINATION DEVELOPMENT – EXAMINATION FORMS

The INBDE is administered over two days and is ten and a half hours long. There are 400 scorable items and 100 pretest items. The examination is administered in six 105-minute sections to allow candidates breaks between sections.

Examination forms are constructed by JCNDE's test development team of industrial and organizational psychologists. Each form is constructed based on the content specifications. In addition, all examination forms are constructed using the same criteria to ensure that forms are comparable in terms of content and item difficulty.

**Finding 7:** The procedures used to construct the INBDE forms appear consistent with professional guidelines and technical standards.

## EXAMINATION DEVELOPMENT – EXAMINATION SCORING

The INBDE consists of 400 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. In calculating a candidate's score, the raw score is obtained by computing the number of items answered correctly. The passing score for the examination is determined using the Bookmark standard setting procedure.

As part of the validation process, examinations are continually evaluated to ensure they are measuring required knowledge. In addition, candidates can make comments during their examination about the examination or questions.

Results for candidates who achieve a score at or above the cut score are reported as "pass." Candidates who fail the examination receive information about their performance in each of the clinical component areas and foundation knowledge areas assessed on the examination. This allows candidates to identify areas of weakness and to study for reexamination. Candidates who fail also receive their overall scaled score. A scaled score of 75 is required to pass the examination.

After administration of the examination, JCNDE performs item analyses and evaluates overall examination statistics, including test mean and test standard deviation. Items identified as problematic are reviewed by SMEs. Items are evaluated with respect to p-values and adjusted point-biserial correlations. Those items meeting the psychometric standards are then incorporated into the 3 parameter Item Response Theory (IRT) model. Candidate comments are also taken into consideration in the review of problematic items as part of the comprehensive review of an examination's performance. OPES reviewed examination level performance data provided by JCNDE.

**Finding 8:** The examination-level statistics indicate adequate performance for licensure examinations.

**Finding 9:** The scoring criteria for the INBDE is applied equitably, and the examination scoring process appears consistent with professional guidelines and technical standards.

## CONCLUSIONS

The examination development activities conducted by JCNDE appear to meet professional guidelines and technical standards regarding the use of item development and examination construction, the linkage of each item to the examination content outline, pretesting, the development of new examination forms, and scoring. The steps taken to score the examination appear to provide a fair and objective evaluation of candidate performance. The steps taken to evaluate examination performance also appear to be reasonable.

## CHAPTER 4 | PASSING SCORES AND PASSING RATES

Unless otherwise noted, the source for the information in this chapter is the 2021 *JCNDE INBDE Technical Report* and the additional information provided by JCNDE.

### PASSING SCORE 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 *2014 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). The supporting commentary 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).

*Policy OPES 20-01*, as mandated by BPC § 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.

## STANDARD SETTING METHODOLOGY

JCNDE uses a criterion-referenced Bookmark standard setting method to set the passing scores for the INBDE. This method relies on the expert judgment of SMEs to determine the knowledge a candidate should possess to be minimally competent for safe and effective practice.

JCNDE Standard Setting Committees consist of SMEs who are practitioners, practical examination raters, and educators. Committees are facilitated by JCNDE psychometricians. SMEs who participate in the standard setting process are required to sign JCNDE's security agreement.

The passing score setting process begins with SMEs reviewing non-disclosure and security agreements. The facilitator then explains the purpose of standard setting as well as general information regarding the INBDE. Panelists are then instructed to take a truncated form that is representative of the INBDE in terms of psychometric standards as well as content distribution. After completing the truncated form, the facilitator gives a presentation on the Bookmark procedure and provides a definition of the Just Qualified Candidate (JQC). The SMEs are then broken into groups and are instructed to discuss and list the specific distinguishing knowledge, skills, and abilities of the JQC. These discussions are transcribed and used as references for the SMEs when considering the JQC in later portions of the workshop.

The Bookmark procedure is introduced using a practice ordered item booklet (OIB). The booklet contains 12 items arranged from easiest to hardest. The SMEs are told to indicate on which page of the OIB the JQC would have at least a 66% chance of choosing the correct answer. The results of the practice exercise are discussed, and then the same process is applied to the INBDE items. In subsequent rounds, additional information about item performance is supplied



to the SMEs along with new ordered item booklets. The results of the Bookmark procedure determine the theta value which corresponds to the JFC and is used in the equating process to determine the cut score for forms.

IRT statistics and the Bookmark standard setting results are used along with the examination content specifications to produce parallel forms of the examinations based on the criterion-referenced passing score standard.

**Finding 10:** The participation of SMEs in setting the passing standard meets professional guidelines and technical standards. However, including the service of educators in the process is not fully compliant with *Policy OPES 20-01*, as mandated by BPC § 139.

**Recommendation 4:** To be fully compliant with *Policy OPES 20-01*, OPES recommends phasing out or limiting the service of educators as SMEs during standard setting processes.

**Finding 11:** The methods used to set the passing standard for the INBDE appear consistent with professional guidelines and technical standards.

## PASSING RATES

The passing rates for the INBDE were provided for 2020 and 2021. The passing rates were broken down by first-time attempt, and retake and school accreditation. The first attempt passing rates for candidates from accredited institutions was approximately 99%; the pass rate for candidates from unaccredited institutions was approximately 67%. The overall pass rate for first-time attempts is approximately 86%.

**Finding 12:** The methods used to determine the cut score and the resulting candidate pass rates appear to be consistent with professional guidelines and technical standards.

**Recommendation 5:** JCNDE should consider the implications of the high INBDE passing rate for candidates from accredited institutions. It is possible that the examination is an unnecessary barrier for some candidates.

## CONCLUSIONS

The passing score methodology used by JCNDE to set the passing standard and determine the scaled scores demonstrate a sufficient degree of validity, thereby appearing to meet professional guidelines and technical standards. The difference in passing rates between accredited and unaccredited schools indicates that the INBDE is capturing an underlying difference in the ability of candidates. The difference in pass rates provides support for the validity of the INBDE to assess the knowledge necessary for minimum competency for the practice of dentistry.

## CHAPTER 5 | TEST ADMINISTRATION AND SCORE REPORTING

Unless otherwise noted, the source for the information in this chapter is the *2021 JCNDE INBDE Technical Report* and the additional information provided by JCNDE.

### TEST ADMINISTRATION STANDARDS

The following standards are most relevant to the test administration process for licensure examinations, as referenced in the *2014 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).

**TEST ADMINISTRATION – INFORMATION AND INSTRUCTIONS TO CANDIDATES**

All candidates receive a candidate guide that informs them of the structure and purpose of the examination. The guide includes examples of standard questions, as well as questions with a 'Patient Box' and dental charts.

The JCNDE website provides detailed information about the INBDE. The JCNDE website includes the following information for candidates:

- Specific information about taking the test on the computer
- Examination scoring and provision of score reports
- Examination accommodations
- Examination site reporting, check-in, and security procedures
- Security procedures and security breach information

JCNDE also provides an option for candidates to become familiar with the test-taking process. Candidates are shown the scheduling and registration process, the check-in process, the test center staff and surroundings, and a generic 15-minute sample test.

**Finding 13:** The directions and instructions provided to candidates appear straightforward. The information available to candidates is detailed and comprehensive.

#### TEST ADMINISTRATION – CANDIDATE REGISTRATION

Approved candidates can register to take the examination on the ADA.org website. After the registration process is complete, candidates are eligible to take the examination for a six-month period. Candidates must provide identification which matches the registration exactly.

The JCNDE website and the Candidate Information Bulletin (CIB) provides detailed instructions and information about the application and registration process, including:

- Examinee license application requirements and qualifications
- Schedule of examination fees
- Examination application, registration, and scheduling
- Rescheduling or canceling a test appointment

**Finding 14:** The INBDE 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

JCNDE complies with the Americans with Disabilities Act and provides reasonable accommodations to candidates with documented disabilities or medical conditions. Candidates who require testing accommodations must submit a Request for Special Examination Accommodations form that indicates the accommodation requested to address functional limitations. The second page of the form requires a signed evaluation report completed by a qualified health care professional that includes information about the candidate's disability or diagnosis and recommendations for accommodation.

**Finding 15:** JCNDE's accommodation procedures appear consistent with professional guidelines and technical standards.

#### TEST ADMINISTRATION – TEST CENTERS

Prometric administers the INBDE throughout the calendar year via computer at one of 18 designated Prometric testing centers. Prometric's testing centers use trained proctors and controlled testing conditions.

#### TEST ADMINISTRATION – STANDARDIZED PROCEDURES AND TESTING ENVIRONMENT

Candidates are tested in similar testing centers, using the same type of equipment, under the same conditions. All candidates are assessed on the same examination content.

**Finding 16:** The procedures established for the INBDE test administration process and the testing environment appear to be consistent with professional guidelines and technical standards.

## SCORE REPORTING

Examination results are typically provided 3–4 weeks after the examination date. Candidates' pass/fail status is reported to their licensing entity, and candidates can view their results by logging into their account on JCNDE's website.

## CONCLUSIONS

The test administration protocols established by JCNDE and Prometric appear to be consistent with professional guidelines and technical standards.

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## CHAPTER 6 | TEST SECURITY

### TEST SECURITY STANDARDS

Unless otherwise noted, the source for the information in this chapter is the 2021 *JCNDE INBDE Technical Report* and the additional information provided by JCNDE.

The following standards are most relevant to test security for licensure examinations, as referenced in the *2014 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).

### TEST SECURITY – EXAMINATION MATERIALS AND CANDIDATE INFORMATION

JCNDE has developed policies and procedures for maintaining the custody of materials and for conveying responsibility for examination security to examination developers, administrators, and users.

JCNDE staff are trained in procedures for handling secure materials and are required to comply with JCNDE policies regarding confidentiality. In addition, SMEs involved in examination development processes must complete a security agreement.

The candidate information booklet addresses the following areas regarding security:

- Candidates must provide current and valid government-issued photo ID to sit for all examinations. The name on the ID must match the name on the admission letter, the photo must be recognizable as the person that the ID was issued to, and the candidate must keep their ID with them at all times.
- Candidates are prohibited from leaving the examination area without permission.
- Candidates are prohibited from communicating with other candidates.
- Candidates are prohibited from requesting information from proctors and examiners about the examination.
- Candidates are prohibited from bringing any cellular phones, electronic devices, materials, or personal belongings into the examination rooms.

**Finding 17:** The security procedures practiced by JCNDE regarding the handling of examination materials and managing candidates appear to meet professional guidelines and technical standards.

## TEST SECURITY – TEST SITES

Prometric staff are trained in procedures for maintaining security of examination materials at test sites.

At test sites, candidates are required to provide current and valid government-issued identification to sit for the examination. In addition, Prometric staff use biometric technology to capture each candidate's identity.

The CIB lists items that candidates are prohibited from bringing into secure testing areas. Prohibited items include, but are not limited to, outside books or reference materials, electronic devices, and accessories. In addition, the CIB describes the examination security procedures, including the consequences of examination subversion or falsification of information.

During candidate check-in, Prometric staff perform visual inspections to check for recording devices and other prohibited items. All testing sessions are monitored by staff at the test center. Proctors are trained to recognize potential test security breaches. In addition, testing sessions are video recorded.

**Finding 18:** The security procedures practiced by Prometric at test sites are consistent with professional guidelines and technical standards.

## CONCLUSIONS

The test security protocols established by JCNDE and Prometric for handling examination materials, candidate information, and in the test sites appear to meet professional guidelines and technical standards.

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## CHAPTER 7 | COMPARISON OF THE INBDE CONTENT OUTLINE WITH THE CALIFORNIA DESCRIPTION OF DENTIST PRACTICE

### PARTICIPATION OF SUBJECT MATTER EXPERTS

OPES convened a 2-day teleconference linkage study workshop on January 19-20, 2023, to evaluate the INBDE content outline and to compare it with the description of practice from the 2018 *California OA*.

OPES worked collaboratively with the Board to recruit nine SMEs to participate in the workshop. The SMEs represented the profession in terms of license type, years of experience, and geographic location in California. All SMEs worked as dentists in various settings.

### LINKAGE STUDY WORKSHOP PROCESS

Before the workshop, the SMEs completed OPES' security agreement, self-certification, and personal data (demographic) forms. At the beginning of the workshop, the OPES test specialist explained the importance of, and the guidelines for, security during and outside the workshop.

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

The SMEs were instructed to evaluate and link each task statement and each knowledge statement of the California dentist description of practice to the topic areas included on the INBDE content outline. The SMEs worked as a group to evaluate and link all the tasks and knowledge statements.

The JCNDE INBDE content outline is provided in Table 1. Table 2 provides the content areas of the corresponding California description of practice.

TABLE 1 – JCNDE INBDE CONTENT OUTLINE

<p><b>Foundation Knowledge Area 1 (FK1) focuses on application of knowledge of molecular, biochemical, cellular, and systems-level development, structure and function, to aid in the prevention, diagnosis, and management of oral disease and to promote and maintain oral health.</b></p>
<p>1.1 Structure and function of the normal cell and basic types of tissues comprising the human body.</p>
<p>1.2 Structure and function of cell membranes and the mechanism of neurosynaptic transmission.</p>
<p>1.3 Mechanisms of intra and intercellular communications and their role in health and disease.</p>
<p>1.4 Health maintenance through the regulation of major biochemical energy production pathways and the synthesis/degradation of macromolecules. Impact of dysregulation in disease on the management of oral health.</p>
<p>1.5 Atomic and molecular characteristics of biological constituents to predict normal and pathological function.</p>
<p>1.6 Mechanisms that regulate cell division and cell death, to explain normal and abnormal growth and development.</p>
<p>1.7 Biological systems and their interactions to explain how the human body functions in health and disease.</p>
<p>1.8 Principles of feedback control to explain how specific homeostatic systems maintain the internal environment and how perturbations in these systems may impact oral health.</p>
<p><b>Foundation Knowledge Area 2 (FK2) focuses on application of knowledge of physics and chemistry to explain normal biology and pathobiology, to aid in the prevention, diagnosis, and management of oral disease and to promote and maintain oral health.</b></p>
<p>2.1 Principles of blood gas exchange in the lung and peripheral tissue to understand how hemoglobin, oxygen, carbon dioxide and iron work together for normal cellular function.</p>
<p>2.2 Impact of atmospheric pressure and changes therein (e.g., high altitudes, in space, or underwater).</p>
<p>2.3 The stability and dissolution of enamel and dentin as a result of factors and conditions within the oral environment, including: abrasion, attrition and erosion; changes in oral pH; exposure to physical or chemical substances, or to physical force (gritty/rough physical materials, stone powder, acidic food or drink, bulimia, bruxism, physical trauma, etc.).</p>
<p>2.4 External forces resulting in hard and soft tissue trauma; tissue milieu factors that play a role in inflammation, erosion, overgrowth, or necrosis.</p>
<p>2.5 Ergonomic issues resulting in loss of productivity, musculoskeletal disorders, illnesses, injuries, or decreased work satisfaction (contingent on the intensity, frequency and duration of exposure).</p>

TABLE 1 – JCNDE Foundation Knowledge (Continued)

<p><b>Foundation Knowledge Area 3 (FK3) focuses on application of knowledge of physics and chemistry to explain the characteristics and use of technologies and materials used in the prevention, diagnosis, and management of oral disease and to promote oral health.</b></p>
<p>3.1 Principles of radiation, radiobiologic concepts, and the uses of radiation in the diagnosis and treatment of oral and systemic conditions.</p>
<p>3.2 Dental material properties, biocompatibility, and performance, and the interaction among these in working with oral structures in health and disease.</p>
<p>3.3 Principles of laser usage; the interaction of laser energy with biological tissues; uses of lasers to diagnose and manage oral conditions.</p>
<p><b>Foundation Knowledge Area Four (FK4) Principles of Genetic, Congenital, and Developmental Diseases and Conditions and their Clinical Features to Understand Patient Risk</b></p>
<p>4.1 Genetic transmission of inherited diseases and their clinical features to inform diagnosis and the management of oral health.</p>
<p>4.2 Congenital (non-inherited) diseases and developmental conditions and their clinical features to inform the provision of oral health care.</p>
<p><b>Foundation Knowledge Area 5 (FK5) focuses on the application of knowledge of the cellular and molecular bases of immune and non-immune host defense mechanisms in the prevention, diagnosis, and management of oral disease and the promotion and maintenance of oral health.</b></p>
<p>5.1 Function and dysfunction of the immune system, of the mechanisms for distinction between self and non-self (tolerance and immune surveillance) to the maintenance of health and autoimmunity.</p>
<p>5.2 Differentiation of hematopoietic stem cells into distinct cell types and their subclasses in the immune system and its role for a coordinated host defense against pathogens (e.g., HIV, hepatitis viruses).</p>
<p>5.3 Mechanisms that defend against intracellular or extracellular microbes and the development of immunological prevention or treatment strategies.</p>

TABLE 1 – JCNDE Foundation Knowledge (Continued)

<p><b>Foundation Knowledge Area 6 (FK6) focuses on the application of knowledge of general and disease-specific pathology to assess patient risk in the prevention, diagnosis, and management of oral disease and the promotion and maintenance of oral health.</b></p>
<p>6.1 Cellular responses to injury; the underlying etiology, biochemical, and molecular alterations; and the natural history of disease; in order to assess therapeutic intervention.</p>
<p>6.2 Vascular and leukocyte responses of inflammation and their cellular and soluble mediators to understand the prevention, causation, treatment and resolution of tissue injury.</p>
<p>6.3 Interplay of platelets, vascular endothelium, leukocytes, and coagulation factors in maintaining fluidity of blood, formation of thrombi, and causation of atherosclerosis as it relates to the management of oral health.</p>
<p>6.4 Impact of systemic conditions on the treatment of dental patients.</p>
<p>6.5 Mechanisms, clinical features, and dental implications of the most commonly encountered metabolic systemic diseases.</p>
<p><b>Foundation Knowledge Area 7 (FK7) focuses on the application of knowledge of the biology of microorganisms in physiology and pathology in the prevention, diagnosis, and management of oral disease and the promotion and maintenance of oral health.</b></p>
<p>7.1 Principles of host–pathogen and pathogen–population interactions and knowledge of pathogen structure, transmission, natural history, and pathogenesis to the prevention, diagnosis, and treatment of infectious disease.</p>
<p>7.2 Principles of epidemiology to achieving and maintaining the oral health of communities and individuals.</p>
<p>7.3 Principles of symbiosis (commensalisms, mutualism, and parasitism) to the maintenance of oral health and prevention of disease.</p>
<p><b>Foundation Knowledge Area 8 (FK8) focuses on the application of knowledge of pharmacology in the prevention, diagnosis, and management of oral disease and the promotion and maintenance of oral health.</b></p>
<p>8.1 Pathologic processes and basic principles of pharmacokinetics and pharmacodynamics for major classes of drugs and over-the-counter products to guide safe and effective treatment.</p>
<p>8.2 Optimal drug therapy for oral conditions based on an understanding of pertinent research, relevant dental literature, and regulatory processes.</p>



TABLE 1 – JCNDE Foundation Knowledge (Continued)

<p><b>Foundation Knowledge Area 9 (FK9) focuses on the application of knowledge of sociology, psychology, ethics, and other behavioral sciences in the prevention, diagnosis, and management of oral disease and the promotion and maintenance of oral health.</b></p>
<p>9.1 Principles of sociology, psychology, and ethics in making decisions regarding the management of oral health care for culturally diverse populations of patients.</p>
<p>9.2 Principles of sociology, psychology and ethics in making decisions and communicating effectively in the management of oral health care for the child, adult, geriatric, or special needs patient.</p>
<p>9.3 Principles of sociology, psychology, and ethics in managing fear and anxiety and acute and chronic pain in the delivery of oral health care.</p>
<p>9.4 Principles of sociology, psychology, and ethics in understanding and influencing health behavior in individuals and communities.</p>
<p>9.5 Principles of psychology, ethics and related principles of practice management in making decisions regarding delivery of care and choice of instrumentation, materials, and treatment.</p>
<p><b>Foundation Knowledge Area 10 (FK10) focuses on the application of research methodology and analysis, and informatics tools in the prevention, diagnosis, and management of oral disease and the promotion and maintenance of oral health.</b></p>
<p>10.1 Basic mathematical tools and concepts, including functions, graphs and modeling, measurement and scale, and quantitative knowledge, in order to understand the specialized functions of membranes, cells, tissues, organs, and the human organism, especially those related to the head and neck, in both health and disease.</p>
<p>10.2 Principles and logic of epidemiology and the analysis of statistical data in the evaluation of oral disease risk, etiology, and prognosis.</p>
<p>10.3 Principles of information systems, use, and limitations, and their application to information retrieval and clinical problem solving.</p>
<p>10.4 Biomedical and health informatics, including data quality, analysis, and visualization, and its application to diagnosis, therapeutics, and characterization of populations and subpopulations.</p>
<p>10.5 Elements of the scientific process, such as inference, critical analysis of research design, and appreciation of the difference between association and causation, to interpret the findings, applications, and limitations of observational and experimental research in clinical decision-making using original research articles as well as review articles.</p>

TABLE 2– CONTENT AREAS OF THE 2018 CALIFORNIA DENTIST DESCRIPTION OF PRACTICE

<b>CONTENT AREA</b>	<b>Weights</b>
1. Patient Evaluation	13
2. Endodontics	6
3. Indirect Restoration	7
4. Direct Restoration	7
5. Preventative Care	5
6. Periodontics	4
7. Fixed Partial Dentures	6
8. Removable Partial Dentures	4
9. Complete Dentures	4
10. Implant Restoration	3.5
11. Oral Surgery	5
12. Teeth Whitening	2
13. Occlusal Splint Therapy	3
14. Safety and Sanitation	10.5
15. Ethics	7
16. Law	13
Total	100

## LINKAGE RESULTS

The SMEs linked the tasks and knowledge statements of the California description of practice to the INBDE content outline. The SMEs determined that the INBDE did not assess practical demonstration of skills. The INBDE also did not assess California-specific laws and ethical guidelines.

**Finding 19:** The SMEs concluded that the content of the INBDE adequately assesses the basic knowledge required for competent entry level practice of dentists in California.

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## CHAPTER 8 | CONCLUSIONS AND RECOMMENDATIONS

OPES has 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 Integrated INBDE (i.e., OA, examination development and scoring, passing scores and passing rates, test administration and score reporting, and test security procedures) appear to meet professional guidelines and technical standards as outlined in the *2014 Standards* and in BPC § 139.

However, OPES finds that including the service of educators in examination development processes is not fully compliant with *Policy OPES 20-01*, as mandated by BPC § 139. OPES recommends phasing out the service of educators as SMEs.

OPES finds that the experience of practitioners in the OA development should include practitioners with 5 years or less experience.

OPES finds that the occupational analysis process should be evaluated to increase the frequency of occupational analysis.

Given the findings regarding the INBDE, OPES supports the Board's continued use of the INBDE along with the ADEX and LEX examinations for licensure in California.

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## CHAPTER 9 | REFERENCES

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

California Business and Professions Code § 139. (n.d.). State of California.

Department of Consumer Affairs. (2022). *Policy OPES 22-01 Licensure Examination Validation*. State of California.

Department of Consumer Affairs. (2020). *Policy OPES 20-01 Participation in Examination Development Workshops*. State of California.

Office of Professional Examination Services. (2018). *Occupational Analysis of the Dentist Profession*. Department of Consumers Affairs. State of California.

Joint Commission on National Dental Examinations. (2021). *INBDE Technical Report*.