

**“ABOVE THE LINE, BELOW THE LINE”:  
A REVIEW OF SELECTED ISSUES  
CONCERNING THE STATE-CONSTRUCTED  
DENTAL LICENSING EXAMINATION**

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## FOREWORD

This report has been prepared in response to part III of Act 254, Session Laws of Hawaii 1999 (Senate Bill No. 1238, CD1, Twentieth Legislature, 1999), which requests the Legislative Reference Bureau, with the assistance of the Board of Dental Examiners and the Department of Commerce and Consumer Affairs, to study the state-constructed dental licensing examination to determine:

- (1) Whether the state-constructed examination appropriately tests for professional competency in dentistry or serves as an undue exclusionary barrier to entry into the profession;
- (2) Whether any of the four regional dental examinations should be used in lieu of, or as an alternate to, the state-constructed examination; and
- (3) Whether the state-constructed examination is a fair examination.

The Bureau would like to thank the Board and the Department for giving its researcher complete access to the August 1999 dental licensing examination, including the calibration of grading examiners, and confidential data from previous administrations of the examination. In addition, the Bureau would like to express its appreciation to the many individuals who patiently attempted to explain the principles, complexities, and subtleties of operative dentistry, performance-based testing, for professional licensing.

Wendell K. Kimura  
Acting Director

December 1999

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# FACT SHEET

## “Above the Line, Below the Line”: A Selective Look at the State-Constructed Dental Licensing Examination

### I. Highlights

- A. Test Scoring; Appropriateness.** A (compensatory) test scoring system that: (1) makes it mathematically impossible to score greater than 2.000 but less than 3.000 on a one-part test or any part of a two-part test; and (2) lowers marginally unsatisfactory scores and raises marginally satisfactory scores; does not seem an appropriate tool for measuring minimal competency. This increases inter-examiner reliability at the expense of a candidate.
- B. Test Scoring; Fairness.** The suppression of a critical difference grade to increase inter-examiner reliability does not seem fair because such a test scoring system helps some candidates and hurts others in borderline cases.
- C. Test Grading; Appropriateness.** If there is a root cause to the low pass rate on the state-constructed dental licensing examination that does not involve candidate or examiner behavior, it may be the practice of requiring the lowest rating earned by a candidate to control the grade awarded by an examiner.
- D. The Bureau’s Observations.**
- (1) **Candidate examination materials.** The examination materials provided to each candidate do not disclose all the criteria that are used by an examiner. Giving candidates the same information as the examiners might largely eliminate the claim that the candidate failed the dental licensing examination because the candidate did not know what the examiner was looking for.
  - (2) **Examiner standardization session.** According to the calibrator for the August 1999 dental licensing examination, the calibration examination was re-scored because not enough potential examiners had initially passed the calibration examination and because chapter 16-79, Hawaii Administrative Rules, does not contain specific procedures for handling situations where there are not enough qualified examiners to administer a dental licensing examination. According to the calibrator, if the Board had accepted the impartial observer’s 1996 recommendation to change the critical difference grade cut-off from thirteen percent to eighteen percent, there initially would have been enough qualified examiners to administer the August 1999 dental licensing examination.

- (3) **Anonymity between grading examiners and candidates.** The procedures for ensuring anonymity between the grading examiners and the candidates seemed to be well thought out and executed by the Board, the Department, the examiners, and the many volunteer and paid personnel involved with the administration of the examinations.
  - (4) **Assignment of examiners to grading teams.** In February 1997, the Examination Branch began randomly assigning examiners to grading teams in order to guard against the possible introduction of bias—or systematic error—caused by examiners assigning themselves to grading teams. This kind of error would have been difficult to detect in the post-examination analysis conducted by the Examination Branch.
  - (5) **Anonymity of foreign dental school graduates.** Because the restorative technique examination is conducted on ceramic teeth mounted in a mannequin, grading examiners almost certainly know whether a candidate is a United States or foreign dental school graduate. The Bureau, however, did not observe any discussions between examiners regarding the quality of work performed by foreign dental school graduates.
  - (6) **Status of the impartial observer’s recommendations.** Although the Board voted to (1) explore the addition of a nonpatient examination of periodontal diagnosis and treatment planning to the dental licensing examination, and (2) eliminate the class II amalgam preparation test on the mannequin, neither of these decisions has been incorporated into the Board’s rules (Chapter 16-79, Hawaii Administrative Rules), to date.
  - (7) **Use of errata sheet to purportedly amend rules.** Several errors in the grading (rating) criteria for the dental licensing examination have not been corrected through the Administrative Procedure Act. Instead, corrections are listed on a separate errata sheet, which is included in the candidate handbooks. As the so-called “corrections” have never been adopted through the rulemaking process, it would appear that the Board cannot validly apply them.
  - (8) **Substitution of grades if anonymity has been breached.** The data seem to suggest that substituting (a) the grades obtained by a candidate for the preparation part of the class II amalgam test on the mannequin for (b) the grades obtained by the candidate for the preparation part of the class II amalgam test on the patient, may not be appropriate.
- E. United States dental school graduates pass the dental licensing examination at a higher rate than foreign dental school graduates—53.66 percent versus 41.30 percent. The pass rate on the restorative technique examination for this cohort of foreign dental school graduates was 26.73 percent. If the pass rate of foreign dental school graduates on the dental licensing examination is made a function of

their pass rate on the restorative technique examination, then the pass rate for foreign dental school graduates on the dental licensing examination was 18.81 percent instead of 41.30 percent.

If the dental licensing examination was scored using a conjunctive model rather than a compensatory model, then the pass rate for United States dental school graduates would be less than or equal to 25.56 percent instead of 53.66 percent. A conjunctive scoring model places substantial demands on foreign dental school graduates taking the restorative technique examination. Conversely, a compensatory scoring model gives substantial allowances to United States dental school graduates and foreign dental school graduates taking the dental licensing examination.

At the legislative level, the ultimate policy issue that the Legislature must decide is whether to: (1) retain the state-constructed dental examination (the status quo), (2) abolish the state-constructed examination and allow candidates to pass any one of the four regional examinations, or (3) allow candidates to pass either the state-constructed examination or a regional examination. This legislative policy decision is separate and distinct from anyone's opinion on the technical merits or defects of the existing state-constructed dental licensing examination.

The question of whether to authorize the Board of Dental Examiners to accept the results of all four regional testing agencies' examinations does not depend on a determination that the existing state-constructed dental licensing examination is an undue exclusionary barrier to entry into the profession. Instead, this question depends on whether the Legislature's desire for local control of the dental licensing examination, if any, outweighs its concerns about state liability for alleged or proven injustices, convenience and affordability for candidates, and ongoing program costs to the State.

## **II. Frequently Asked Questions**

**A. What was the *Pekarsky* litigation about?** Why does it figure so prominently in past and present discussions about the dental licensing examination?

This federal class action, civil rights lawsuit was brought in 1976 against the Board of Dental Examiners, and contended that the Board had utilized the dental licensing examination to illegally discriminate against candidates for a dental license based on their racial (Caucasian) and nonresident status.

The Board denied Pekarsky's and Koch's allegations of wrongdoing but agreed to settle the lawsuit in 1980. The settlement agreement included the appointment of a court master in 1987—one Dr. A. Lewis Leo, Associate Dean of the University of Florida College of Dentistry and a national dental expert who had been involved in prior phases of the litigation—to modify the dental licensing examination, including the rules relating to its administration.

In 1991, the United States District Court modified the settlement agreement to eliminate the requirement that the court continue to supervise and monitor the dental licensing examination, and discharged Dr. Leo as the court's master. Paragraph 3 of the settlement agreement was modified to read as follows:

3. The requirements and procedures by which candidates for dental licensure are examined and licensed in the State of Hawaii ["licensure requirements"] [*sic*] shall at all times now and in the future conform to the requirements of the Constitution and laws of the United States and the State of Hawaii and shall (a) be based only upon the present state of dental practice and current trends in dental education; (b) utilize only valid and reliable test and measurement procedures; (c) employ only comprehensive objective criteria for measuring the competence of candidates; and, (d) assure that the Hawaii dental licensure examination is anonymous in all respects. . . . [emphasis added]

The United States District Court did not retain continuing jurisdiction to enforce or amend the settlement agreement after 1991.

**B. Why didn't the Bureau draw any definitive conclusions about the appropriateness of the dental licensing examination and its effect on entry into the profession?**

This report reviews selected issues concerning the dental licensing examination. Even with the assistance of the Board of Dental Examiners and the Department of Commerce and Consumer Affairs, the Bureau does not possess adequate expertise in the fields of dentistry or psychometry, much less both, to conduct an expert level of review of this or any other professional licensing examination.

The Bureau cannot conclude that the dental licensing examination, as a technical matter, is either an appropriate test for professional competency or an undue exclusionary barrier to entry into the profession. Some of the Bureau's observations, as noted above, however, indicate that the examination process is less than perfect.

On the other hand, a court-appointed master and an impartial observer hired as a consultant have reviewed the dental licensing examination very favorably. The Bureau has no basis to doubt the findings of the impartial observer, and finds no compelling evidence to conclude that the examination is defective in any significant way.

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# Chapter 1

## INTRODUCTION AND BACKGROUND INFORMATION

### Scope of this Study

**The request.** Part III of Act 254, Session Laws of Hawaii 1999 (Senate Bill No. 1238, CD1, Twentieth Legislature, 1999), which is included in this report as Appendix A, requests the Legislative Reference Bureau to study the state-constructed dental licensing examination to determine:

- (1) Whether the state-constructed examination appropriately tests for professional competency in dentistry or serves as an undue exclusionary barrier to entry into the profession;
- (2) Whether any of the four regional dental examinations should be used in lieu of, or as an alternate to, the state-constructed examination; and
- (3) Whether the state-constructed examination is a fair examination.

Because it is easy to confuse the terms “examination”, “test”, and “part of a test” and what each represents, this study uses the following naming conventions:

“Examination” refers to the state-constructed dental licensing examination, which consists of eight tests, and the restorative technique examination, which consists of three tests.

“Test” refers to the two multiple-choice tests and six performance-based tests that comprise the state-constructed dental licensing examination, and the one multiple-choice test and two performance-based tests that comprise the restorative technique examination. The term also refers to the MOD onlay test and the class II amalgam preparation test on the mannequin, which are one-part tests.

“Part of a test” refers to the preparation and restoration parts of the class II amalgam test and the class III/IV composite test, the anterior and posterior parts of the endodontic procedure test, and the preparation and wax pattern parts of the full crown test, which are two-part tests.

As its name implies, the state-constructed dental licensing examination leads to a license to practice dentistry in Hawaii. The dental licensing examination is not to be confused with the (state-constructed) restorative technique examination, which is administered to dentists who graduate from schools that are not accredited by the Commission on Dental Accreditation of the American Dental Association or the Commission on Dental Accreditation of Canada.<sup>1</sup> The restorative technique examination—or “bench test”—is a qualifying examination conducted on ceramic teeth mounted in a mannequin and prosthetics mounted in a model.<sup>2</sup> Passing the

restorative technique examination qualifies a candidate to take the dental licensing examination,<sup>3</sup> which involves the treatment of live patients.

**Excluded subjects.** This study does not examine the necessity of licensing dentists by examination, including dentists who graduate from accredited U.S. and Canadian dental schools. Likewise, this study does not examine the advisability of licensing out-of-state dentists by credentials, including board-certified dental specialists. While licensing by examination and licensing by credentials are timely, controversial issues, they are beyond the scope of the study specified by Act 254. Persons interested in these issues should consult the report of the Institute of Medicine, Committee on the Future of Dental Education, entitled: *Dental Education at the Crossroads: Challenges and Change*,<sup>4</sup> and the background paper by Karen Guarino, entitled: “Licensure and Certification of Dentists and Accreditation of Dental Schools”,<sup>5</sup> which was commissioned for the Committee.

Although the dental licensing examination consists of two multiple-choice tests<sup>6</sup> and six performance-based tests<sup>7</sup>, the performance-based tests are weighted so heavily that it is possible for a candidate to earn a weighted score of 0.000 on both multiple-choice tests and still pass the examination.<sup>8</sup> In addition, as between multiple-choice tests and performance-based tests, it is more difficult to administer and grade performance-based tests. Finally, the data indicate that few candidates fail<sup>9</sup> either of the two multiple-choice tests, and even fewer candidates fail both tests.<sup>10</sup> For these reasons, this study focuses entirely on the six performance-based tests, which collectively make up eighty-five percent (85%) of a candidate’s total weighted score on the dental licensing examination.

### **Applicability to Past Boards and the Present Board**

The reader is urged to bear in mind that the present Board of Dental Examiners, like its predecessors, operates under policy decisions that were made before its time. The seeds of problems that are sprouting under the present Board of Dental Examiners were, in fact, planted many years ago by previous boards. This report **should not** be used to place any blame on prior boards or board members. It is important to understand “why” something happened or did not happen so corrective and preventive action can be taken, if deemed necessary. It is unnecessary to affix blame for previous policy decisions and present problems since blame cannot fix a problem.

### **Determining Appropriateness and Fairness**

As previously mentioned, Act 254 requests the Bureau to determine if the dental licensing examination appropriately tests for professional competency in dentistry. For the purposes of this study, an appropriate test is one that is valid and reliable. Simply stated, a test is valid to the extent that it measures what it was designed to measure—in this case, minimal competency.<sup>11</sup> A test is reliable to the extent that it consistently or accurately measures what it measures—in this case, levels of clinical performance. A test cannot be valid unless it is reliable. Within the context of the six performance-based tests comprising the dental licensing

examination, a fair test is one that gives all candidates an equal opportunity to demonstrate their clinical competency while protecting the public against substandard practitioners.<sup>12</sup>

Developing a single test that is both highly valid and highly reliable can be difficult since the goals of validity and reliability are sometimes incompatible with one another. A test can be valid for its intended use but unreliable. For example, essays and writing, oral discourse and presentations, exhibitions, experiments, and portfolios may be highly valid strategies for measuring critical thinking skills in children, but they can be highly unreliable. Similarly, a test can be reliable but not valid for its intended use. For example, standardized tests may be highly reliable tools for measuring student achievement, but their results may not be valid if the tests are used for purposes or in ways that test developers did not intend, such as imposing sanctions and rewards on schools, principals, and teachers. There is no such thing as a perfect test; and while testing is a science in itself, it is an imperfect science. In addition, there is more than one acceptable method for testing a candidate's competency to practice dentistry.<sup>13</sup>

Because the dental licensing examination is intended to identify candidates who are at least minimally competent to practice dentistry independently and safely, the examination must be implemented by dentists to be valid.<sup>14</sup> According to Dr. A. Lewis Leo, however, "just having the credentials of being a dentist is not sufficient in developing and maintaining examinations that are current and that reflect the constant technical changes that are occurring in the practice of dentistry". In order to incorporate a better understanding in testing techniques, the Board must be educated in the art of testing (according to Dr. Leo), which is the province of psychometricians.

## **The Purpose of Licensing**

**Licensure versus certification.** According to the Committee to Develop Standards for Educational and Psychological Testing of the American Educational Research Association, the American Psychological Association, and the National Council on Measurement in Education, which prepared *Standards for Educational and Psychological Testing*, the primary purpose of professional and occupational licensure and certification is to protect the public.<sup>15</sup>

Licensing requirements are imposed to ensure that individuals who are licensed possess knowledge and skills in a sufficient degree to perform important occupational activities safely and effectively. The purpose of certification is to provide the public with a dependable mechanism for identifying practitioners who have met particular standards. The classical distinction between licensing and certification is that licensing usually sets minimum standards, while certification sets standards well above the minimum. In recent years, however, this distinction has become blurred because many certification agencies have set their standards at the entry level.

For licensure or certification, the focus of test standards is on levels of knowledge and skills necessary to assure the public that an individual is competent to practice. Tests are used in licensure or certification to help ensure that individuals who are licensed or certified meet or

exceed a standard or specified level of performance. Cut scores for licensure and certification tests—or the specified points on score scales at or above which candidates pass or are accepted and below which candidates fail or are rejected—are determined on the basis of competency rather than supply and demand. Consequently, there is no explicit limit (*e.g.*, the number of vacancies to be filled) on the number of individuals who can be considered qualified.

**Hawaii Regulatory Licensing Reform Act.** Chapter 26H, *Hawaii Revised Statutes*, otherwise known as the Hawaii Regulatory Licensing Reform Act, prescribes policies regarding the regulation of professions, including dentistry. These policies are:<sup>16</sup>

- (1) The regulation and licensing of professions and vocations shall be undertaken only where reasonably necessary to protect the health, safety, or welfare of consumers of the services; the purpose of regulation shall be the protection of the public welfare and not that of the regulated profession or vocation;
- (2) Regulation in the form of full licensure or other restrictions on certain professions or vocations shall be retained or adopted when the health, safety, or welfare of the consumer may be jeopardized by the nature of the service offered by the provider;
- (3) Evidence of abuses by providers of the service shall be accorded great weight in determining whether regulation is desirable;
- (4) Professional and vocational regulations that artificially increase the costs of goods and services to the consumer shall be avoided except in those cases where the Legislature determines that this cost is exceeded by the potential danger to the consumer;
- (5) Professional and vocational regulations shall be eliminated when the Legislature determines that they have no further benefits to consumers;
- (6) Regulation shall not unreasonably restrict entry into professions and vocations by all qualified persons; and
- (7) Fees for regulation and licensure shall be imposed for all vocations and professions subject to regulation; provided that the aggregate of the fees for any given regulatory program shall not be less than the full cost of administering that program.

**Sunset evaluation reports.** According to the Auditor, the practice of dentistry poses a clear and significant potential for public harm and the absence of regulation would unnecessarily expose the public to possible harm.<sup>17</sup> Included within a dentist's scope of practice are several irreversible procedures that can potentially result in costly corrective treatment, serious injury, and even loss of life. A significant public risk is involved when a dentist is allowed to diagnose or treat any injury of the mouth or teeth. This risk is increased when a dentist is allowed to perform oral surgery or to administer radiographs (X-rays), anesthesia, and other sedatives or drugs. An incompetent or negligent dentist can harm consumers by failing to treat oral cancers

and cysts; by misusing anesthetics, analgesics, sedatives, and antibiotics; and by doing unnecessary and costly dental work, among other potentially harmful practices.

Because of the significant and immediate potential harm posed by incompetent or negligent practitioners, the Auditor recommended in both 1984 and 1987 that dentists continue to be licensed (*i.e.*, regulated).

### **Becoming a Dentist in Hawaii**

**Graduates of accredited schools.** To become a dentist in Hawaii, an individual who graduated from a dental school accredited by the Commission on Dental Accreditation of the American Dental Association or the Commission on Dental Accreditation of Canada<sup>18</sup> must have:

- (1) Passed part II of the two-part, multiple-choice, National Board Dental Examinations administered by the Joint Commission on National Dental Examinations not more than five years prior to the date of the state-constructed dental licensing examination;<sup>19</sup> and
- (2) Passed the state-constructed dental licensing examination administered by the Hawaii Board of Dental Examiners.<sup>20</sup>

These requirements apply equally to recent graduates and practicing dentists, including board-certified dental specialists.

**Graduates of unaccredited schools.** An individual who graduated from a dental school not accredited by the Commission on Dental Accreditation of the American Dental Association or the Commission on Dental Accreditation of Canada, must have:

- (1) Been deemed qualified by the Joint Commission on National Dental Examinations to take the National Board Dental Examinations;<sup>21</sup>
- (2) Passed part II of the National Board Dental Examinations not more than five years prior to the date of the state-constructed restorative technique examination;
- (3) Passed the restorative technique examination; and
- (4) Passed the state-constructed dental licensing examination.

These requirements apply equally to recent graduates and practicing dentists, including board-certified dental specialists.

## The Pekarsky Litigation<sup>22</sup>

This class action, civil rights lawsuit was brought in 1976 against the Board of Dental Examiners by Dr. Robert Pekarsky and Dr. Arnie Koch on behalf of all persons who were of Caucasian ancestry or who, at the time of application for a license to practice dentistry, were not residents of Hawaii or were residents of Hawaii for not more than three years, and who were denied a license after August 1, 1974, and before February 1, 1980. The essence of Dr. Pekarsky's and Dr. Koch's complaint was that the Board had utilized the dental licensing examination to illegally discriminate against candidates for a license to practice dentistry based on their racial and residential status. The lawsuit was brought in United States District Court for the District of Hawaii pursuant to the Privileges and Immunities Clause, the Commerce Clause, the Due Process Clause, the Equal Protection Clause, and the Fourteenth Amendment to the United States Constitution.

The Board denied Pekarsky's and Koch's allegations of wrongdoing but agreed to settle the lawsuit in 1980. The settlement agreement provided for the payment of \$325,000 in damages by the Board (not including \$146,616 in attorneys' fees<sup>23</sup>), the modification of dental licensing examination procedures, and the expungement of class members' examination records, without an admission of guilt or liability by the Board. The settlement agreement included the appointment of a court master in 1987—one Dr. A. Lewis Leo, Associate Dean of the University of Florida College of Dentistry and a national dental expert who had been involved in prior phases of the litigation—to modify the dental licensing examination, including the rules relating to its administration. The modified rules were adopted by the Board and approved by the Governor in 1990.

In 1991, the United States District Court modified the settlement agreement to eliminate the requirement that the court continue to supervise and monitor the dental licensing examination, and discharged Dr. Leo as the court's master. Paragraph 3 of the settlement agreement was modified to read as follows:<sup>24</sup>

3. The requirements and procedures by which candidates for dental licensure are examined and licensed in the State of Hawaii ["licensure requirements"] [*sic*] shall at all times now and in the future conform to the requirements of the Constitution and laws of the United States and the State of Hawaii and shall (a) be based only upon the present state of dental practice and current trends in dental education; (b) utilize only valid and reliable test and measurement procedures; (c) employ only comprehensive objective criteria for measuring the competence of candidates; and, (d) assure that the Hawaii dental licensure examination is anonymous in all respects. Subject to the foregoing, the licensure requirements shall be governed by Chapter 448, Hawaii Revised Statutes (HRS) ["Dentists"] [*sic*], and Chapter 16-79, Hawaii Administrative Rules (HAR) ["Dentists and Dental Hygienists"] [*sic*]. Consistent with the foregoing, Chapter 448, HRS, and Chapter 16-79, HAR, may be amended according to State law without further approval of this Court. [emphasis added]

The United States District Court did not retain continuing jurisdiction to enforce or amend the settlement agreement after 1991.<sup>25</sup>

## Endnotes

<sup>1</sup> By reciprocal agreement, programs that are accredited by the Commission on Dental Accreditation of Canada are recognized by the Commission on Dental Accreditation of the American Dental Association. American Dental Association, “Dental Schools in the U.S. and Canada: Accredited Program Listing”. <http://www.ada.org/prac/careers/apl-01.html> (October 13, 1999).

<sup>2</sup> The restorative technique examination consists of a class II amalgam restoration, a class III/IV composite restoration, and a “differentiation” test on prosthodontics.

<sup>3</sup> Section 16-79-91(c), Hawaii Administrative Rules (Department of Commerce and Consumer Affairs; Dentist and Dental Hygienists)

<sup>4</sup> Institute of Medicine, Committee on the Future of Dental Education, Marilyn Field (ed.), *Dental Education at the Crossroads: Challenges and Change* (Washington, D.C.: National Academy Press, 1995), 368 pp.

<sup>5</sup> Karen Guarino, “Licensure and Certification of Dentists and Accreditation of Dental Schools”, *Journal of Dental Education*, Vol. 59, No. 1, 1995, pp. 205-236.

<sup>6</sup> A 104-item “written” test on infection control, oral diagnosis, treatment planning, and dental materials and a 30-item “differentiation” test on prosthodontics.

<sup>7</sup> Class II amalgam restoration performed on a live patient, class III/IV composite restoration performed on a live patient, endodontic procedure performed on two extracted human teeth mounted in plaster, full crown performed on a ceramic tooth mounted in a mannequin, MOD onlay performed on a ceramic tooth mounted in a mannequin, and class II amalgam preparation performed on a ceramic tooth mounted in a mannequin.

<sup>8</sup> See the following example:

	<u>Raw Score</u>	<u>Weight</u>	<u>Weighted Score</u>
Multiple-choice tests			
Written	0.000	0.05	0.000
Differentiation	0.000	0.10	0.000
Performance-based tests			
Amalgam restoration	5.000	0.20	1.000
Composite restoration	5.000	0.25	1.250
Endodontic preparation	5.000	0.05	0.250
Full crown preparation & wax up	5.000	0.15	0.750
MOD onlay preparation	5.000	0.10	0.500
Class II amalgam preparation	5.000	0.10	<u>0.500</u>
Total weighted score			4.250 (Pass)

A raw score of 3.666 on each performance-based test and a raw score of 0.000 on each multiple-choice test would yield a total weighted score of 3.116, which is sufficient to pass the dental licensing examination.

A raw score on the written test is computed using the following formula:

$$\{[(\text{number correct} \times 100) \div 104] - 37.5\} \div 12.5$$

This formula requires candidates to get at least 40 out of the 104 items correct in order to earn a raw score greater than 0.000. Anything less than 40 items correct would earn a raw score of 0.000.

A raw score on the differentiation test is computed using the following formula:

$$(\text{number correct} \div 30) \times 5$$

<sup>9</sup> A raw score greater than or equal to 3.000 is considered a passing score; a raw score less than 3.000 is considered a failing score. Raw scores are computed to three decimal places then truncated. Because raw scores are not rounded up, a score of 2.999999 would be considered a failing score.

<sup>10</sup> Candidates who took the dental licensing examination between February 1995 and February 1999, failed the written test twenty-six times and the differentiation test two times. The written test was administered two hundred thirty-two times and the differentiation test was administered two hundred twenty-nine times, between February 1995 and February 1999, in connection with the dental licensing examination.

<sup>11</sup> Adapted from American Dental Association, American Association of Dental Examiners, and American Association of Dental Schools, Joint Committee on Examiner Calibration, "Guidelines for Examiner Standardization" (Chicago: October 1998), pp. 4 and 11.

American Dental Association and American Association of Dental Examiners, "Guidelines for Valid and Reliable Dental Licensure Clinical Examinations" (Chicago: May 1992), pp. 7 and 10.

<sup>12</sup> In his March 24, 1988, report to the United States District Court, the court's master (Dr. Leo) wrote:

While I fully concur that an examination should be fair, valid, reliable and non-biased, none of the above conditions should preclude the Board from protecting the public against substandard practitioners. Fairness in developing and implementing an examination is a difficult but not impossible task when the doctrine has to demonstrate equality to both the candidates and the public. [emphasis added]

A. Lewis Leo, "Report of Court Appointed Master of Hawaii Dental Examination, Civil No. 76-0455, Robert L. Pekarsky and Arnie J. Koch, Individually, and on Behalf of All Other Similarly Situated, Plaintiffs, vs. George R. Ariyoshi, et. al., and His Capacity as Governor: State of Hawaii, et. al., Defendants" (March 24, 1988), p. 19. See The *Pekarsky* Litigation, this chapter.

<sup>13</sup> According to the Joint Committee on Examiner Calibration:

Several acceptable methods have been devised to characterize the candidate's performance on each exercise with a numerical score. Many scoring systems (additive, deductive or a combination of both) can be acceptable, provided the criteria are clear, concise and can be operationalized by the examiners. . . .

American Dental Association, American Association of Dental Examiners, and American Association of Dental Schools, Joint Committee on Examiner Calibration, "Guidelines for Examiner Standardization" (Chicago: October 1998), p. 7.

<sup>14</sup> A. Lewis Leo, "Report of Court Appointed Master of Hawaii Dental Examination, Civil No. 76-0455, Robert L. Pekarsky and Arnie J. Koch, Individually, and on Behalf of All Other Similarly Situated, Plaintiffs, vs. George R. Ariyoshi, et. al., and His Capacity as Governor: State of Hawaii, et. al., Defendants" (March 24, 1988), pp. 19-20.

American Dental Association, American Association of Dental Examiners, and American Association of Dental Schools, Joint Committee on Examiner Calibration, "Guidelines for Examiner Standardization" (Chicago: October 1998), p. 4.

<sup>15</sup> Committee to Develop Standards for Educational and Psychological Testing of the American Educational Research Association, the American Psychological Association, and the National Council on Measurement in Education, *Standards for Educational and Psychological Testing* (Washington, DC: 1985), pp. 63-64.

<sup>16</sup> *Hawaii Revised Statutes*, section 26H-2.

<sup>17</sup> Hawaii, Legislative Auditor, *Sunset Evaluation Report, Dentistry, Chapter 448, Hawaii Revised Statutes*, Report No. 87-19 (Honolulu: December 1987), pp. 3-4, 9-10, and 18.

Hawaii, Legislative Auditor, *Sunset Evaluation Report, Dentistry, Chapter 448, Hawaii Revised Statutes*, Report No. 84-2 (Honolulu: January 1984), pp. 17-19 and 32.

<sup>18</sup> Section 16-79-9(5), Hawaii Administrative Rules (Department of Commerce and Consumer Affairs; Dentists and Dental Hygienists).

<sup>19</sup> Section 16-79-11(b), Hawaii Administrative Rules (Department of Commerce and Consumer Affairs; Dentists and Dental Hygienists).

<sup>20</sup> Section 16-79-90(a), Hawaii Administrative Rules (Department of Commerce and Consumer Affairs; Dentists and Dental Hygienists).

<sup>21</sup> The educational credentials of a candidate who attends a dental school not accredited by the Commission on Dental Accreditation of the American Dental Association or the Commission on Dental Accreditation of Canada are evaluated for the Joint Commission on National Dental Examinations by Educational Credential Evaluators (ECE), Inc. of Milwaukee, Wisconsin. American Dental Association, "National Board Dental Examination Program", <http://www.ada.org/prac/careers/natbd.html> (October 13, 1999).

According to Ms. Margit Schatzman, Vice President of ECE:

When ECE evaluates foreign educational programs, we determine if an institution offering a program is the equivalent of a regionally-accredited institution in the United States. Most other countries do not use the concept of "accreditation" in their educational systems. If they do use the term accreditation, it often does not reflect the same concept as regional accreditation in the United States.

In order to find out if the foreign institution has a status which is equivalent of U.S. accreditation, we determine if that institution is a recognized, postsecondary degree-granting institution. In most countries the only entity which is endowed with the right to authorize an institution to award degrees is a government body. In many countries that government entity is called the ministry of education, or a similarly-titled organization. When education involves the health professions another government body, such as the ministry of health, often has responsibility to oversee and authorize postsecondary institutions.

When we analyze foreign educational systems, we would be looking for that type of recognition when determining if a foreign institution has the equivalent of regional academic accreditation in the United States.

In many countries the academic degree and the permission to practice a licensed profession are one and the same credential.

Margit Schatzman, [margit@ece.org](mailto:margit@ece.org), "RE: Accreditation of Foreign Dental Schools", August 9, 1999. Personal e-mail to writer (August 9, 1999).

<sup>22</sup> Robert L. Pekarsky and Arnie J. Koch, Individually, and on Behalf of All Other Similarly Situated, Plaintiffs, vs. George R. Ariyoshi, et. al., and His Capacity as Governor: State of Hawaii, et. al., Defendants, Civil No. 76-0455, United States District Court.

This discussion is based substantially on the facts disclosed in:

- (1) Robert L. Pekarsky and Arnie J. Koch, Individually, and on Behalf of All Other Similarly Situated, Plaintiffs, vs. George R. Ariyoshi, et. al., and His Capacity as Governor: State of

Hawaii, et. al., Defendants, Civil No. 76-0455, United States District Court, “Stipulation and Agreement of Settlement”, November 5, 1980, 7 pp.; and

- (2) Robert L. Pekarsky and Arnie J. Koch, Individually, and on Behalf of All Other Similarly Situated, Plaintiffs, vs. John Waihee, et. al., and His Capacity as Governor: State of Hawaii, et. al., Defendants, Civil No. 76-00455 ACK, United States District Court, “Order Denying Movant Arthur J. Misischia’s Motion for Leave to File Supplemental Complaint”, August 6, 1996, pp. 2-3.

<sup>23</sup> *The Honolulu Advertiser*, “State still must pay \$146,616 in dental exam case”, December 3, 1983.

<sup>24</sup> Robert L. Pekarsky and Arnie J. Koch, Individually, and on Behalf of All Other Similarly Situated, Plaintiffs, vs. John Waihee, et. al., and His Capacity as Governor: State of Hawaii, et. al., Defendants, Civil No. 76-0455, United States District Court, “Order Granting Joint Motion for an Order Modifying Final Judgment”, September 25, 1991, p. 4.

<sup>25</sup> Robert L. Pekarsky and Arnie J. Koch, Individually, and on Behalf of All Other Similarly Situated, Plaintiffs, vs. John Waihee, et. al., and His Capacity as Governor: State of Hawaii, et. al., Defendants, Civil No. 76-00455 ACK, United States District Court, “Order Denying Movant Arthur J. Misischia’s Motion for Leave to File Supplemental Complaint”, August 6, 1996, pp. 7-8.

## Chapter 2

### THE STATE-CONSTRUCTED DENTAL LICENSING EXAMINATION

#### Scope and Organization of this Chapter

This chapter discusses the structure of the dental licensing examination, the grading and scoring of the tests that make up the examination, and the scoring of the examination itself. It also discusses the naming convention that will be used whenever the grading and scoring of these tests and the examination are discussed.

#### Naming Convention

**Ratings, Grades, and Scores.** Because it is easy to confuse the terms “ratings”, “grades”, and “scores” and what each represents, this study uses the following naming conventions:

“Ratings” are expressed as deviations from the ideal, that is: “slight”, “moderate”, “marked”, “gross”, and “critical”. These ratings correspond to the following grades: slight—“4”, moderate—“3”, marked—“2”, gross—“1”, and critical—“0”; and ideal—“5”

“Grades” are expressed as whole numbers, that is: “0”, “1”, “2”, “3”, “4”, and “5”. Grades are averaged to produce scores. At least two grades must be averaged to produce a score.

“Scores” are expressed as fractional numbers, for example: “0.000”, “1.000”, “2.000”, “3.000”, “4.000”, and “5.000”. Scores are the average of at least two grades or the weighted average of two or more other scores.

#### Structure of the Dental Licensing Examination

As previously mentioned, the dental licensing examination consists of two multiple-choice tests and six performance-based tests. The six performance-based tests are described below in Table 1.

**Table 1: Performance-Based Tests on the Dental Licensing Examination<sup>1</sup>**

Name of the test	Number of parts to the test and the weight of each part in relation to the test	Grading scale for the test or part of the test	Relation of the test to total weighted score in percent <sup>b</sup>	Relation of the test to total weighted score in points <sup>c</sup>	Number of graders and grades
Class II amalgam restoration (live patient)	Two parts: Preparation – 60% Restoration – 40%	Preparation: 0-5 Restoration: 0-5	20% of total weighted score	0.000-1.000 points	Preparation – 3 Restoration – 3
Class III/IV composite restoration (live patient)	Two parts: Preparation – 40% Restoration – 60%	Preparation: 0-5 Restoration: 0-5	25% of total weighted score	0.000-1.250 points	Preparation – 3 Restoration – 3
Endodontic procedure (extracted human teeth mounted in plaster)	Two parts: Anterior – 50% Posterior – 50%	Anterior: 0-5 Posterior: 0-5	5% of total weighted score	0.000-0.250 points	Anterior – 3 Posterior – 3
Full crown (ceramic tooth mounted in a mannequin)	Two parts: Preparation – 70% Wax pattern – 30%	Preparation: 0-5 Wax pattern: 0-5	15% of total weighted score	0.000-0.750 points	Preparation – 3 Wax pattern – 3
MOD <sup>a</sup> onlay (ceramic tooth mounted in a mannequin)	One part: Preparation	Preparation: 0-5	10% of total weighted score	0.000-0.500 points	Preparation – 3
Class II amalgam preparation (ceramic tooth mounted in a mannequin)	One part: Preparation	Preparation: 0-5	10% of total weighted score	0.000-0.500 points	Preparation – 3
<sup>a</sup> Involving the mesial, occlusal, and distal surfaces of the tooth			<sup>b</sup> Does not equal 100% because the written and differentiation tests are excluded	<sup>c</sup> Does not equal 5.000 because the written and differentiation tests are excluded	

## Grades

Grading is done on a six-point scale ranging from “0” to “5”, with “0” being characterized as “highly unsatisfactory (critical errors)”, “1” being characterized as “unsatisfactory (gross errors)”, “2” being characterized as “minimally unsatisfactory (marked errors)”, “3” being characterized as “minimally satisfactory (moderate errors)”, “4” being characterized as “satisfactory (slight errors)”, and “5” being characterized as “ideal”.<sup>2</sup> A grade of “0”, “1”, or “2” is considered a failing grade—or “below the line”; a grade of “3”, “4”, or “5” is considered a passing grade—or “above the line”.

## Grading a Test

Each grade earned by a candidate on a test or part of a test reflects the lowest rating that was awarded to the candidate by an examiner.<sup>3</sup> For example, if an examiner noted a slight

deviation from the ideal on the criteria—damage to adjacent tooth/soft tissue, and no deviations from the ideal on all the other criteria listed below in Table 2 (except those criteria requiring a mandatory grade of “0”), then the grade awarded by the examiner would be a “4”. Although a rating of ideal corresponds to a grade of “5” and a rating of slight deviation corresponds to a grade of “4”, and although there are many more 5’s than there are 4’s in this example, the lowest rating earned by a candidate (*i.e.*, slight deviation from the ideal) controls the grade awarded (*i.e.*, “4”). High and low ratings are not averaged and an examiner is not required to enter a rating for each criteria listed in Table 2<sup>4</sup> since the grading system is designed to look for the most substantive deviation from the ideal. In fact, unrated criteria (*i.e.*, blank spaces) are treated as if there were no deviations from the ideal and are awarded a grade of “5”. According to the Board of Dental Examiners, high and low ratings are not averaged because the integrity of a class II amalgam restoration (*i.e.*, filling) (for example) is only as good as the weakest part of its preparation.<sup>5</sup>

**Table 2: Grading Sheet for the Class II Amalgam Preparation Test<sup>6</sup>**

<b>AMALGAM PREPARATION</b>	
<b>External Outline Form</b>	
Occlusal Outline Form	_____
Extension	_____
Damage to Adjacent Tooth/Soft Tissue	_____
<b>Internal Form</b>	
Axial Wall	_____
Pulpal Wall	_____
Gingival Wall	_____
Retention Form	_____
Removal of Caries	_____
<b>Cavity Refinement</b>	
Cavo-Surface Finish	_____
Toilet of Cavity	_____
<b>Pulpal Protection</b>	
_____	_____
<hr/>	
<b>ERRORS REQUIRING MANDATORY GRADE OF “0”</b>	
Mechanical Pulp Exposure	_____
Failure to Detect Pulp Exposure (Pathological)	_____
Preparation of Tooth and/or Surfaces(s)	_____
Not Approved or Assigned by Examiners	_____
<b>COMMENTS:</b>	
EXAMINER _____	RATING (Circle One ONLY)    5 4 3 2 1 0
Note: Indicate error by using the following legend which shows the degree of deviation from the ideal: S = Slight; M = Moderate; Mk = Marked; G = Gross; C = Critical	

## Scoring a Test

A candidate's score on a test, including a part of a test, is the average of three grades except when one of the three grades disagrees about whether the candidate passed or failed the test.<sup>7</sup> In the latter case, the disagreeing grade—also referred to as a critical difference grade—is suppressed (*i.e.*, not counted, deleted, thrown out, *etc.*) and the two remaining grades are averaged to derive the candidate's score on the test. A critical difference grade is suppressed to eliminate examiner variability or to increase inter-examiner reliability. Under this system, a passing grade (*e.g.*, "3") would be suppressed if two of the three examiners awarded a candidate failing grades (*e.g.*, "0", "2"). Conversely, a failing grade (*e.g.*, "2") would be suppressed if two of the three examiners awarded a candidate passing grades (*e.g.*, "3", "5"). According to Dr. Leo, the individual who developed and tested the abovementioned system, a system that allows for the elimination of a disagreeing grade from either a passing or failing mode is necessary in order to eliminate grader variability.<sup>8</sup>

The suppression of a critical difference grade makes it mathematically impossible for a candidate to earn a score that is greater than 2.000 but less than 3.000 on a one-part test or any part of a two-part test,<sup>9</sup> and lowers the score of a marginally unsatisfactory performance and raises the score of a marginally satisfactory performance.<sup>10</sup> One critical difference grade would be enough to pass or fail a candidate if all three grades were averaged and the critical difference grade was not suppressed.<sup>11</sup> The derivation of scores is illustrated below in Table 3 for a one-part test and Table 4 for a two-part test.

**Table 3: Derivation of Scores from Grades; One-Part Test**

Grades earned on a test <sup>a</sup>	Critical difference grade, if any <sup>b</sup>	Grades averaged for a score <sup>c</sup>	Score <sup>d</sup>
"0", "1", "2"	None	"0", "1", "2"	1.000
"3", "4", "5"	None	"3", "4", "5"	4.000
"2", "3", "4"	"2"	"3", "4"	3.500
"1", "2", "3"	"3"	"1", "2"	1.500
"5", "5", "5"	None	"5", "5", "5"	5.000
"0", "0", "0"	None	"0", "0", "0"	0.000
<sup>a</sup> Always equal to three grades	<sup>b</sup> Cannot be greater than one grade	<sup>c</sup> Cannot be less than two grades	<sup>d</sup> Cannot exceed 5.000

**Table 4: Derivation of Scores from Grades; Two-Part Test**

Grades earned on a part	Critical difference grade, if any	Weight of each part <sup>a</sup>	Subscores	Combined score <sup>b</sup>
Preparation: "0", "1", "2" Restoration: "3", "4", "5"	Preparation: None Restoration: None	Preparation: 60% Restoration: 40%	Preparation: 0.600 Restoration: 1.600	2.200
Anterior: "2", "3", "4" Posterior: "1", "2", "3"	Anterior: "2" Posterior: "3"	Anterior: 50% Posterior: 50%	Anterior: 1.750 Posterior: 0.750	2.500
Preparation: "5", "5", "5" Restoration: "0", "0", "0"	Preparation: None Restoration: None	Preparation: 40% Restoration: 60%	Preparation: 2.000 Restoration: 0.000	2.000
		<sup>a</sup> Always equal to 100%		<sup>b</sup> Cannot exceed 5.000

**Scoring the Examination**

In order to pass the dental licensing examination, a candidate must earn a total weighted score of 3.000 or more. It is not necessary to pass each test or part of a test. In fact, it is possible for a candidate to earn a score of 0.000 on the endodontic procedure test, the full crown test, the MOD onlay test, and the Class II amalgam preparation test on the mannequin, and still pass the dental licensing examination.<sup>12</sup> This is called a compensatory scoring model because a candidate can compensate for a low score in one test by earning a high score in another test. In contrast, some licensing authorities (*e.g.*, Illinois<sup>13</sup>) and regional testing agencies (*e.g.*, the North East Regional Board of Dental Examiners<sup>14</sup>) use a conjunctive scoring model, which requires a candidate to pass each test. A conjunctive model is more demanding of candidates than a compensatory model, and the pass rate for a conjunctive model is lower than a comparable compensatory model.

The extent to which a candidate can compensate for a low score in one test by earning a high score in another depends on the tests involved since certain tests and parts of tests are weighted more heavily than others. For example, a candidate can compensate fully for a low score in the wax pattern part of the full crown test (see the vertical axis of Table 5) by earning a 1.000-point higher score (*e.g.*, a “4.000” instead of a “3.000”) in another test (*e.g.*, the MOD onlay) or part of a test (*e.g.*, the preparation part of the full crown test) except the anterior and posterior parts of the endodontic procedure test (see the horizontal axis of Table 5). On the other hand, a candidate can compensate fully for a low score in the preparation part of the full crown test (see the vertical axis of Table 5) by earning a 1.000-point higher score in only the preparation part of the class II amalgam test on a live patient and the restoration part of the class III/IV composite test (see the horizontal axis of Table 5). A candidate cannot compensate fully for a low score in the restoration part of the class III/IV composite test (see the vertical axis of Table 5) by earning a 1.000-point higher score in another test or part of a test (see the horizontal axis of Table 5). The limitations of the compensatory scoring model are illustrated below in Table 5, which indicates whether or not a 1.000-point higher score in one test or part of a test (indicated on the horizontal axis) can compensate fully for a low score in another test or part of a test (indicated on the vertical axis). The relation of a test or part of a test to a candidate’s total weighted score in points is illustrated below in Table 6.

**Table 5: The Limitations of Compensatory Scoring—  
Can a 1.000-point higher score in one test or part of a test (horizontal axis) compensate fully  
for a low score in another test or part of a test (vertical axis)?**

	<b>Higher Score</b>	<b>AP 0.120</b>	<b>AR 0.080</b>	<b>CP 0.100</b>	<b>CR 0.150</b>	<b>EA 0.025</b>	<b>EP 0.025</b>	<b>FCP 0.105</b>	<b>WAX 0.045</b>	<b>MOD 0.100</b>	<b>CLS II 0.100</b>
<b>Low Score</b>											
<b>AP 0.120</b>		----	No	No	Yes	No	No	No	No	No	No
<b>AR 0.080</b>		Yes	----	Yes	Yes	No	No	Yes	No	Yes	Yes
<b>CP 0.100</b>		Yes	No	----	Yes	No	No	Yes	No	Yes	Yes

(cont.)	Higher Score	AP 0.120	AR 0.080	CP 0.100	CR 0.150	EA 0.025	EP 0.025	FCP 0.105	WAX 0.045	MOD 0.100	CLS II 0.100
CR 0.150		No	No	No	----	No	No	No	No	No	No
EA 0.025		Yes	Yes	Yes	Yes	----	Yes	Yes	Yes	Yes	Yes
EP 0.025		Yes	Yes	Yes	Yes	Yes	----	Yes	Yes	Yes	Yes
FCP 0.105		Yes	No	No	Yes	No	No	----	No	No	No
WAX 0.045		Yes	Yes	Yes	Yes	No	No	Yes	----	Yes	Yes
MOD 0.100		Yes	No	Yes	Yes	No	No	Yes	No	----	Yes
CLS II 0.100		Yes	No	Yes	Yes	No	No	Yes	No	Yes	----

See Table 6 for the meaning of the abbreviations “AP”, “AR”, “CP”, etc.

**Table 6: Relation of a Test or Part of a Test to Total Weighted Score in Points**

Name of test	Relation of a test or part of a test to total weighted score in points <sup>a</sup>
Class II amalgam restoration (patient)	Preparation (AP): 0.000-0.600 points, increasing in increments of 0.120 Restoration (AR): 0.000-0.400 points, increasing in increments of 0.080
Class III/IV composite restoration (patient)	Preparation (CP): 0.000-0.500 points, increasing in increments of 0.100 Restoration (CR): 0.000-0.750 points, increasing in increments of 0.150
Endodontic procedure	Anterior (EA): 0.000-0.125 points, increasing in increments of 0.025 Posterior (EP): 0.000-0.125 points, increasing in increments of 0.025
Full crown	Preparation (FCP): 0.000-0.525 points, increasing in increments of 0.105 Wax pattern (WAX): 0.000-0.225 points, increasing in increments of 0.045
MOD onlay	Preparation (MOD): 0.000-0.500 points, increasing in increments of 0.100
Class II amalgam preparation (mannequin)	Preparation (CLS II): 0.000-0.500 points, increasing in increments of 0.100
	<sup>a</sup> Does not equal 5.000 because the written and differentiation tests are excluded

The conjunctive scoring model applies to candidates taking the dental licensing examination only when the candidates are retaking portions of the examination they failed previously. If a candidate failed a dental licensing examination but received a passing grade on five or more tests, then the candidate could decide to retake only the failed tests<sup>15</sup> during the next scheduled administration of the examination. The candidate, however, would have to retake all the failed tests and earn a passing grade on each. Similarly, candidates who are required to take the restorative technique examination must pass the 30-item “differentiation” test on prosthodontics, the class II amalgam restoration, and the class III/IV composite restoration with a score of 3.000 or more on each test. Unlike the dental licensing examination, which uses a compensatory scoring model, the restorative technique examination uses a conjunctive scoring model.

**Putting it All Together**

The following examples illustrate how the preparation part of the class II amalgam test is graded and scored, and how a compensatory scoring model differs from a conjunctive scoring model.

**Grading the preparation part of the class II amalgam test.**

Criteria	Examiner		
	A	B	C
Occlusal Outline Form	<u>C</u>	<u>      </u>	<u>      </u>
Extension	<u>      </u>	<u>Mk</u>	<u>M</u>
Damage to Adjacent Tooth/Soft Tissue	<u>      </u>	<u>      </u>	<u>      </u>
Axial Wall	<u>G</u>	<u>Mk</u>	<u>      </u>
Pulpal Wall	<u>      </u>	<u>      </u>	<u>M</u>
Gingival Wall	<u>Mk</u>	<u>M</u>	<u>      </u>
Retention Form	<u>      </u>	<u>      </u>	<u>      </u>
Removal of Caries	<u>      </u>	<u>      </u>	<u>      </u>
Cavo-Surface Finish	<u>      </u>	<u>      </u>	<u>M</u>
Toilet of Cavity	<u>Mk</u>	<u>Mk</u>	<u>      </u>
Pulpal Protection	<u>      </u>	<u>      </u>	<u>      </u>
Grade	0	2	3

Degree of deviation from the ideal (“5”): S = Slight (“4”); M = Moderate (“3”); Mk = Marked (“2”); G = Gross (“1”); C = Critical (“0”)

**Scoring the preparation part of the class II amalgam test.**

Grades earned on this part	“0”, “2”, “3”
Critical difference grade, if any	“3”
Grades averaged for a score	“0”, “2”
Score for this part	1.000 out of a possible 5.000

**Compensatory versus conjunctive scoring models.**

	Raw Score	Compensatory Scoring Model	Compensatory Scoring Model
Multiple-choice tests			
Written	3.000	Weighted Score = 0.150	Passing score
Differentiation	4.833	Weighted Score = 0.483	Passing score
Performance-based tests			
Amalgam restoration	2.000	Weighted Score = 0.400	Failing score
Composite restoration	3.000	Weighted Score = 0.750	Passing score
Endodontic preparation	3.000	Weighted Score = 0.150	Passing score
Full crown preparation & wax up	3.00	Weighted Score = 0.450	Passing score

(cont.)	Raw Score	Compensatory Scoring Model	Compensatory Scoring Model
MOD onlay preparation	4.000	Weighted Score = 0.400	Passing score
Class II amalgam preparation	3.000	Weighted Score = 0.300	Passing score
Results		Total weighted score = 3.083	7 passing scores; 1 failing score
Passing criterion		Total weighted score $\geq$ 3.000	Eight passing scores ( $\geq$ 3.000)
Final outcome		The candidate passed the exam	The candidate failed the exam

## Endnotes

<sup>1</sup> Hawaii, Department of Commerce and Consumer Affairs, “Instructions and Information for the Hawaii Dental Licensure Examination (August 1999), pp. 1-4.

<sup>2</sup> Hawaii, Department of Commerce and Consumer Affairs, “Instructions and Information for the Hawaii Dental Licensure Examination (August 1999), p. 4 and Attachment A – 1b.

<sup>3</sup> Interview with Ms. Dawn Kubota and Ms. Jodi Leandro, Licensing Examiners, Department of Commerce and Consumer Affairs, Professional and Vocational Licensing Division, Examination Branch, September 9, 1999.

Personal notes from the standardization session for examiners, for the August 1999 dental licensing examination, conducted by Dr. Robert Christoffersen, Executive Associate Dean, University of the Pacific Dental School (August 13, 1999).

<sup>4</sup> Interview with Ms. Dawn Kubota and Ms. Jodi Leandro, Licensing Examiners, Department of Commerce and Consumer Affairs, Professional and Vocational Licensing Division, Examination Branch, September 9, 1999.

<sup>5</sup> Interview with Dr. Wallace Chong, Jr., Chairperson, Board of Dental Examiners, Department of Commerce and Consumer Affairs, October 7, 1999.

During the development of (what were at the time) new grading forms and procedures for the dental licensing examination, Dr. Leo made the following observations with respect to the old grading forms and procedures:

There was little correlation between the degree of error or the errors indicated in the subcriteria with the final grade given each candidate. Although the graders came up with a high degree of agreement on the final grade, there was little agreement on the errors that determined the final grade. . . .

\* \* \*

The grading forms are too complex and there is a great deal of interrelationships between the subcriteria. While the graders probably saw the same error, they interpreted the subcriteria differently which resulted in the lack of reliability in determining the category correctly. The grading sheet used in the examination would be a great academic instrument in which a student’s trend of committing certain errors could be determined, but its use in a terminal evaluation is much too complex. Suggested grading forms have been included in this package that maintains the same criteria but greatly reduces the subcriteria. . . . [internal citation deleted]

A. Lewis Leo, “Report of Court Appointed Master of Hawaii Dental Examination, Civil No. 76-0455, Robert L. Pekarsky and Arnie J. Koch, Individually, and on Behalf of All Other Similarly Situated, Plaintiffs, vs. George R. Ariyoshi, et. al., and His Capacity as Governor: State of Hawaii, et. al., Defendants” (April 4, 1988), pp. 1-2.

While it is argued that high and low ratings are not averaged because the integrity of a restoration is only as good as the weakest part of its preparation (*i.e.*, the interrelatedness issue), the practical outcome of not having to average

high and low ratings seems to be increased inter-examiner reliability. Averaging high and low ratings is possible only if each examiner enters a rating for each criteria; however, the more ratings involved—the greater the chance of discord.

According to the American Association of Dental Examiners:

[Scoring systems] that are overly complicated or require the examiner to make many fine distinctions in judging the candidate’s performance are discouraged, as they may be difficult for examiners to apply consistently and thus impede calibration. A good scoring system:

- a. maximizes inter-rater reliability;
- b. is psychometrically sound; and
- c. is statistically valid (i.e., scores are representative of a candidate’s performance).

American Dental Association, American Association of Dental Examiners, and American Association of Dental Schools, Joint Committee on Examiner Calibration, “Guidelines for Examiner Standardization” (Chicago: October 1998), p. 7.

Since the dental licensing examination is not a teaching tool, the Bureau believes that it is probably more important for the Board to know whether a candidate passed or failed a test, as opposed to a candidate knowing why the candidate passed or failed a test.

<sup>6</sup> Hawaii, Department of Commerce and Consumer Affairs, “Grading Sheet for the Class II Amalgam Preparation Test” (August 1999), 1 p.

<sup>7</sup> Section 16-79-103(c), Hawaii Administrative Rules (Department of Commerce and Consumer Affairs; Dentists and Dental Hygienists).

<sup>8</sup> A. Lewis Leo, “Report of Court Appointed Master of Hawaii Dental Examination, Civil No. 76-0455, Robert L. Pekarsky and Arnie J. Koch, Individually, and on Behalf of All Other Similarly Situated, Plaintiffs, vs. George R. Ariyoshi, et. al., and His Capacity as Governor: State of Hawaii, et. al., Defendants” (March 24, 1988), p. 11.

<sup>9</sup> There is no combination of the grades “0”, “1”, or “2” that, when averaged, will result in a score that is greater than 2.000. Similarly, there is no combination of the grades “3”, “4”, or “5” that, when averaged, will result in a score that is less than 3.000. The void between a score of 2.000 and a score of 3.000 is unusual not because it exists, but because of its size. Scores increase in increments of 0.333 and 0.500 points, except through the void. See the following example:

Score	Grades	Critical difference grade to be suppressed, if any
0.000	“0”, “0”, “0”	
0.333	“0”, “0”, “1”	
0.500	“0”, “1”, “3”	“3”
0.666	“0”, “1”, “1”	
1.000	“1”, “1”, “1”	
1.333	“1”, “1”, “2”	
1.500	“1”, “2”, “3”	“3”
1.666	“1”, “2”, “2”	
2.000	“2”, “2”, “2”	
***** <i>Break in continuity</i> *****		
3.000	“3”, “3”, “3”	
3.333	“3”, “3”, “4”	
3.500	“2”, “3”, “4”	“2”

(cont.)

Score	Grades	Critical difference grade to be suppressed, if any
3.666	“3”, “4”, “4”	
4.000	“4”, “4”, “4”	
4.333	“4”, “4”, “5”	
4.500	“2”, “4”, “5”	“2”
4.666	“4”, “5”, “5”	
5.000	“5”, “5”, “5”	

<sup>10</sup> See the following example:

Characterization of performance	Grades earned on a test <sup>a</sup>	Critical difference grade, if any <sup>b</sup>	Grades averaged for a score <sup>c</sup>	Score <sup>d</sup>
Marginally unsatisfactory	“2”, “2”, “3”	“3”	“2”, “2”	2.000
Marginally satisfactory	“2”, “3”, “3”,	“2”	“3”, “3”	3.000
	<sup>a</sup> Always equal to three grades	<sup>b</sup> Cannot be greater than one grade	<sup>c</sup> Cannot be less than two grades	<sup>d</sup> Cannot exceed 5.000

If the grades “2”, “2”, and “3” are averaged, the result is a score of 2.333. If the grades “2”, “3”, and “3” are averaged, the result is a score of 2.666. The suppression of the critical difference grade lowers the score of the marginally unsatisfactory performance by 0.3333 points and raises the score of the marginally satisfactory performance by 0.3333.

<sup>11</sup> See the following examples:

<b>Example I</b>	<u>Grade(s)</u>	<u>Raw Score</u>	<u>Weighted Score</u>
Multiple-choice tests			
Written	78/104	3.000	0.150
Differentiation	29/30	4.833	0.483
Performance-based tests			
Amalgam restoration	2,2,2	2.000	0.400
Composite restoration	3,3,3	3.000	0.750
Endodontic preparation	3,3,3	3.000	0.150
Full crown preparation & wax up	3,3,3	3.000	0.450
MOD onlay preparation	4,4,4	4.000	0.400
Class II amalgam preparation	2,2,3 <sup>a</sup>	2.000	<u>0.200</u>
Total weighted score			2.983 (Fail)

<sup>a</sup>The “3” is suppressed because it is a critical difference grade

<b>Example II</b>	<u>Grade(s)</u>	<u>Raw Score</u>	<u>Weighted Score</u>
Multiple-choice tests			
Written	78/104	3.000	0.150
Differentiation	29/30	4.833	0.483
Performance-based tests			
Amalgam restoration	2,2,2	2.000	0.400
Composite restoration	3,3,3	3.000	0.750
Endodontic preparation	3,3,3	3.000	0.150
Full crown preparation & wax up	3,3,3	3.000	0.450
MOD onlay preparation	4,4,4	4.000	0.400
Class II amalgam preparation	2,2,3 <sup>b</sup>	2.333	<u>0.233</u>
Total weighted score			3.016 (Pass)

<sup>b</sup>The “3” is not suppressed; the raw score is the average of all three grades

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<sup>12</sup> See the following example:

	<u>Raw Score</u>	<u>Weight</u>	<u>Weighted Score</u>
Multiple-choice tests			
Written	5.000	0.05	0.250
Differentiation	5.000	0.10	0.500
Performance-based tests			
Amalgam restoration	5.000	0.20	1.000
Composite restoration	5.000	0.25	1.250
Endodontic preparation	0.000	0.05	0.000
Full crown preparation & wax up	0.000	0.15	0.000
MOD onlay preparation	0.000	0.10	0.000
Class II amalgam preparation	0.000	0.10	<u>0.000</u>
Total weighted score			3.000 (Pass)

<sup>13</sup> American Student Dental Association, *Guide to Dental Licensure* (Chicago: 1999), pp. 34-35.

<sup>14</sup> North East Regional Board of Dental Examiners, "Manual for the Examination in Dentistry, Spring 1999" (Silver Spring: 1999), p. 14.

<sup>15</sup> A candidate cannot retake only one part of a two-part test (*e.g.*, the wax pattern part of the full crown test).

## Chapter 3

### TO THE POINT

#### Scope and Organization of this Chapter

This chapter discusses the appropriateness and fairness of the scoring and grading systems used in the state-constructed dental licensing examination. The Bureau's discussion should not be construed as a criticism of any person involved with the early development of the dental licensing examination. The application of psychometric theories to performance-based or authentic testing (versus standardized testing) is still an emerging field and much of the work that went into the early development of the dental licensing examination as a result of the *Pekarsky* litigation broke new ground. Like dentistry, testing is constantly evolving and improving itself.

To place this chapter into context, the reader is urged to keep the following questions and thoughts in mind throughout this chapter:

- (1) Is it appropriate to lower the score of a marginally unsatisfactory performance in order to increase inter-examiner reliability?

If a grading examiner passes the calibration examination (standardization test) required by section 16-79-100(c), Hawaii Administrative Rules, then the examiner has demonstrated the ability to adhere to and apply the examination grading (rating) criteria. Is it necessary to suppress a critical difference grade during a dental licensing examination when an examiner has already passed the calibration examination and there is no higher authority to speak of once grading begins?

- (2) Should the dental licensing examination be designed to provide reasonable assurance that a candidate is at least minimally competent to practice dentistry independently and safely?<sup>1</sup> Or should the examination provide absolute assurance that a candidate is at least minimally competent?

As demonstrated below in Table 7, two types of error—somewhat analogous to the type I ( $\alpha$ ) and type II ( $\beta$ ) errors found in hypothesis testing—are possible in the dental licensing examination process. One type of error involves “failing” a candidate who is at least minimally competent to practice dentistry independently and safely. The other type of error involves “passing” a candidate who is not minimally competent to practice dentistry independently and safely. Decreasing the chances of passing a candidate who is not minimally competent to practice dentistry may increase—to an unknown degree—the chances of failing a candidate who is at least minimally competent to practice dentistry, and vice-versa.

**Table 7: The Outcomes of Testing—Desirable and Undesirable**

	<b>The candidate is at least minimally competent to practice dentistry independently and safely</b>	<b>The candidate is <u>not</u> minimally competent to practice dentistry independently and safely</b>
<b>The candidate passes the licensing examination</b>	Desirable outcome	Undesirable outcome
<b>The candidate fails the licensing examination</b>	Undesirable outcome	Desirable outcome

### Test Scoring

**Background.** As demonstrated in Chapter 2, the suppression of a critical difference grade:

- (1) Makes it mathematically impossible for a candidate to earn a score that is greater than 2.000 but less than 3.000 (*i.e.*,  $2.000 > x > 3.000$ ) on a one-part test or any part of a two-part test;<sup>2</sup> and
- (2) Lowers the score of a marginally unsatisfactory performance and raises the score of a marginally satisfactory performance.<sup>3</sup>

As also demonstrated in Chapter 2, one critical difference grade would be enough to pass or fail a candidate if all three grades on a test or part of a test were averaged and the critical difference grade was not suppressed.<sup>4</sup>

**Appropriateness.** Lowering the score of a marginally unsatisfactory performance by suppressing a critical difference grade seems inconsistent with a compensatory scoring model, where every point contributes to a candidate’s total weighted score and the production of a pass/fail decision. The suppression of a critical difference grade and the elimination of a score that is greater than 2.000 but less than 3.000 seems more consistent with a conjunctive scoring model, where a candidate must pass each test, or part of each test, with (for example) a score of 3.000 or more. In the case of a conjunctive scoring model, it seems beneficial to candidates and testing agencies to eliminate the ambiguity of scores that are greater than 2.000 but less than 3.000 (*e.g.*, 2.333 and 2.666) and which do not produce clear pass/fail decisions. For example, a score that is between 0.000 and 2.000 is clearly a failing score and a score that is between 3.000 and 5.000 is clearly a passing score. The meaning of a score that is greater than 2.000 but less than 3.000, however, is not so clear.

Although the suppression of a critical difference grade is intended to increase inter-examiner reliability—or agreement among the examiners grading a test or part of a test, the method used to produce this outcome seems more appropriate for making the kind of critical pass/fail decisions associated with a conjunctive scoring model. This seems especially true since suppressing a critical difference grade results in either two passing grades or two failing grades, which may or may not be far apart in their evaluation of a candidate’s performance. For example, although the difference between a grade of “5” and a grade of “3”, or a grade of “2” and a grade of “0”, is twice as great as the difference between a grade of “3” and a grade of “2”,

only the last pair of grades (*i.e.*, the “3” and the “2”) requires the suppression of a critical difference grade. Because a grade of “2” is considered a failing grade and a grade of “3” is considered a passing grade, one of these grades will be considered a critical difference grade. On the other hand, because a grade of “3” and a grade of “5” are both considered passing grades, neither of these grades will be considered a critical difference grade.

The suppression of a grade based on a disagreement about whether a candidate passed or failed a test or part of a test seems counterintuitive at times. This seems especially true when one of the two noncritical difference grades is a “0” (*e.g.*, “0”, “2”, “3”)<sup>5</sup> or a “5” (*e.g.*, “2”, “3”, “5”)<sup>6</sup>. The suppression of a critical difference grade on a one-part test is illustrated below in Table 8.

**Table 8: Suppression of a Critical Difference Grade on a One-Part Test**

Grades earned on a test <sup>a</sup>	Critical difference grade, if any <sup>b</sup>	Grades averaged for a score <sup>c</sup>	Score <sup>d</sup>
“3”, “3”, “5”	None	“3”, “3”, “5”	3.666
“0”, “0”, “2”	None	“0”, “0”, “2”	0.666
“2”, “3”, “5”	“2”	“3”, “5”	4.000
“0”, “2”, “3”	“3”	“0”, “2”	1.000
<sup>a</sup> Always equal to three grades	<sup>b</sup> Cannot be greater than one grade	<sup>c</sup> Cannot be less than two grades	<sup>d</sup> Cannot exceed 5.000

It is not universally accepted that a critical difference grade must be suppressed. For example, the Western Regional Examining Board (WREB) examination does not suppress any grades, *e.g.*, the grades of all three examiners are used to compute a candidate’s score for the preparation part of the class II amalgam test (on a patient).<sup>7</sup> In addition, the suppression of a critical difference grade assumes that the one examiner who gave the critical difference grade was “wrong” and that the two examiners who gave the noncritical difference grades were “right”. The suppression of a critical difference grade assumes that the majority is always right.<sup>8</sup> While this seems to be a reasonable assumption in most cases, it may be difficult for a layperson to understand how an examiner who gave a candidate a grade of “2” can be wrong when the other two examiners gave the candidate grades of “3” and “5”, respectively.<sup>9</sup> Similarly, it may be difficult to understand how an examiner who gave a candidate a grade of “3” can be wrong when the other two examiners gave the candidate grades of “0” and “2”, respectively.

A (compensatory) test scoring system that:

- (1) Makes it mathematically impossible for a candidate to earn a score that is greater than 2.000 but less than 3.000 on a one-part test or any part of a two-part test; and
- (2) Lowers the score of a marginally unsatisfactory performance and raises the score of a marginally satisfactory performance,

does not seem an appropriate tool for measuring minimal competency.

In addition, suppressing a critical difference grade and lowering the score of a marginally unsatisfactory performance increases inter-examiner reliability at the expense of a candidate.

**Fairness.** Lowering the score of a marginally unsatisfactory performance and raising the score of a marginally satisfactory performance in an examination that uses a compensatory scoring model seems to help candidates whose performance is marginally satisfactory and hurt candidates whose performance is marginally unsatisfactory. A fair examination would seem to treat both kinds of candidates equally and without regard to their level of performance. For example, the highest and the lowest of a candidate’s three grades on a test might be suppressed with the one remaining grade becoming the candidate’s score (*i.e.*, the median or middle grade method), or all three grades might be averaged with no grade being suppressed. The median grade method treats both kinds of candidates equally and without regard to their level of performance, and is not easily skewed by extreme grades as demonstrated below in Table 9. On the other hand, the average of all three grades is easily skewed by extreme grades. When there is no skewing, the median grade equals the average grade.

**Table 9: Score Based on the Suppression of the Highest and the Lowest Grades, Averaging All Three Grades, and the Suppression of a Critical Difference Grade**

Grades earned on a test	Score based on the suppression of the highest and the lowest grades ( <i>i.e.</i> , the median or middle grade method)	Score based on the average of all three grades	Score based on the suppression of a critical difference grade, if any
“2”, “2”, “3”	2.000	2.333	2.000
“2”, “3”, “3”	3.000	2.666	3.000
“2”, “3”, “5”	3.000	3.333	4.000
“0”, “2”, “3”	2.000	1.666	1.000
“2”, “2”, “2”	2.000	2.000	2.000
“3”, “3”, “3”	3.000	3.000	3.000
“3”, “3”, “5”	3.000	3.666	3.666
“0”, “0”, “2”	0.000	0.666	0.666
“2”, “2”, “5”	2.000	3.000	2.000
“0”, “3”, “3”	3.000	2.000	3.000

Lowering the score of a marginally unsatisfactory performance and raising the score of a marginally satisfactory performance in an examination that uses a conjunctive scoring model seems fair in some cases since a score that is greater than 2.000 but less than 3.000 is inconclusive if a candidate must pass each test with (for example) a score of 3.000 or more. This does not seem fair, however, in some other cases. For example, the suppression of a critical difference grade hurts a candidate who earns grades of “2”, “2”, and “5” since the candidate’s score would have been a 3.000 if all three grades were averaged. Instead, the candidate’s score will be a 2.000 after the critical difference grade is suppressed. Conversely, the suppression of a critical difference grade helps a candidate who earns grades of “0”, “3”, and “3” since the candidate’s score would have been a 2.000 if all three grades were averaged. Instead, the candidate’s score will be a 3.000 after the critical difference grade is suppressed.

The suppression of a critical difference grade to increase inter-examiner reliability does not seem fair because such a test scoring system helps some candidates and hurts others based on their level of performance.

## Test Grading

**Background.** As discussed in Chapter 2, each grade earned by a candidate on a test or part of a test reflects the lowest rating that was awarded to the candidate by an examiner. High and low ratings are not averaged because the Board of Dental Examiners believes that the integrity of a class II amalgam restoration (for example) is only as good as the weakest part of its preparation.

**Appropriateness.** Basing a grade for a test on the lowest rating that was awarded to a candidate is the functional equivalent of using a conjunctive-type model to score an examination, except that the candidate must earn an “ideal”, “satisfactory (slight errors)”, or “minimally satisfactory (moderate errors)” rating on each criteria in order to “pass”<sup>10</sup> the test. As discussed in Chapter 2, a conjunctive model is more demanding of candidates than a compensatory model, and the pass rate for a conjunctive model is lower than a comparable compensatory model. Whether or not the use of a conjunctive-type model is having the unplanned effect of turning some tests into more than a measure of “minimal competency” is unclear and deserves attention from the Board of Dental Examiners and the Department of Commerce and Consumer Affairs.

It is not universally agreed that high and low ratings should not be averaged because the integrity of a class II amalgam restoration is only as good as the weakest part of its preparation. For example, the Western Regional Examining Board examination divides the grading of a class II amalgam preparation into the following three areas:<sup>11</sup>

“Outline and extension”, which consists of criteria for outline, proximal and gingival extension, removal of decalcification, extension into fissures, and proximal cavosurface angles.

“Internal form”, which consists of criteria for retention; pulpal floor, axial wall, and gingival floor depth; and support of enamel.

“Operative environment and pulp protection”, which consists of criteria for rubber dam isolation and damage to adjacent tooth contact.

Although the lowest grade within an area, *e.g.*, “pulpal floor, axial wall, and gingival floor depth”, controls the grade awarded by an examiner for the entire area, *e.g.*, “outline and extension”, a candidate’s score for a class II amalgam preparation is essentially the sum of the grades awarded by the examiner for outline and extension, internal form, and operative environment and pulp protection.<sup>12</sup> On the Western Regional Examining Board examination, the lowest grade within an area, *e.g.*, “pulpal floor, axial wall, and gingival floor depth”, does not control a candidate’s score for a class II amalgam preparation.

If there is a root cause to the low pass rate on the state-constructed dental licensing examination that does not involve candidate or examiner behavior, it may be the practice of requiring the lowest rating earned by a candidate to control the grade awarded by an examiner.

## Summary

A (compensatory) test scoring system that:

- (1) Makes it mathematically impossible for a candidate to earn a score that is greater than 2.000 but less than 3.000 on a one-part test or any part of a two-part test; and
- (2) Lowers the score of a marginally unsatisfactory performance and raises the score of a marginally satisfactory performance,

does not seem an appropriate tool for measuring minimal competency.

Suppressing a critical difference grade and lowering the score of a marginally unsatisfactory performance increases inter-examiner reliability at the expense of a candidate.

The suppression of a critical difference grade to increase inter-examiner reliability does not seem fair because such a test scoring system helps some candidates and hurts others based on their level of performance.

If there is a root cause to the low pass rate on the state-constructed dental licensing examination that does not involve candidate or examiner behavior, it may be the practice of requiring the lowest rating earned by a candidate to control the grade awarded by an examiner.

## Endnotes

<sup>1</sup> American Dental Association, American Association of Dental Examiners, and American Association of Dental Schools, Joint Committee on Examiner Calibration, "Guidelines for Examiner Standardization" (Chicago: October 1998), p. 4.

<sup>2</sup> There is no combination of the grades "0", "1", or "2" that, when averaged, will result in a score that is greater than 2.000. Conversely, there is no combination of the grades "3", "4", or "5" that, when averaged, will result in a score that is less than 3.000.

<sup>3</sup> See the following example:

Characterization of performance	Grades earned on a test <sup>a</sup>	Critical difference grade, if any <sup>b</sup>	Grades averaged for a score <sup>c</sup>	Score <sup>d</sup>
Marginally unsatisfactory	"2", "2", "3"	"3"	"2", "2"	2.000
Marginally satisfactory	"2", "3", "3",	"2"	"3", "3"	3.000
	<sup>a</sup> Always equal to three grades	<sup>b</sup> Cannot be greater than one grade	<sup>c</sup> Cannot be less than two grades	<sup>d</sup> Cannot exceed 5.000

If the grades “2”, “2”, and “3” are averaged, the result is a score of 2.333. If the grades “2”, “3”, and “3” are averaged, the result is a score of 2.666. The suppression of the critical difference grade lowers the score of the marginally unsatisfactory performance by 0.3333 points and raises the score of the marginally satisfactory performance by 0.3333.

<sup>4</sup> See the following examples:

<b>Example I</b>	<u>Grade(s)</u>	<u>Raw Score</u>	<u>Weighted Score</u>
Multiple-choice tests			
Written	78/104	3.000	0.150
Differentiation	29/30	4.833	0.483
Performance-based tests			
Amalgam restoration	2,2,2	2.000	0.400
Composite restoration	3,3,3	3.000	0.750
Endodontic preparation	3,3,3	3.000	0.150
Full crown preparation & wax up	3,3,3	3.000	0.450
MOD onlay preparation	4,4,4	4.000	0.400
Class II amalgam preparation	2,2,3 <sup>a</sup>	2.000	<u>0.200</u>
Total weighted score			2.983 (Fail)

<sup>a</sup>The “3” is suppressed because it is a critical difference grade

<b>Example II</b>	<u>Grade(s)</u>	<u>Raw Score</u>	<u>Weighted Score</u>
Multiple-choice tests			
Written	78/104	3.000	0.150
Differentiation	29/30	4.833	0.483
Performance-based tests			
Amalgam restoration	2,2,2	2.000	0.400
Composite restoration	3,3,3	3.000	0.750
Endodontic preparation	3,3,3	3.000	0.150
Full crown preparation & wax up	3,3,3	3.000	0.450
MOD onlay preparation	4,4,4	4.000	0.400
Class II amalgam preparation	2,2,3 <sup>b</sup>	2.333	<u>0.233</u>
Total weighted score			3.016 (Pass)

<sup>b</sup>The “3” is not suppressed; the raw score is the average of all three grades

<sup>5</sup> The “3” is the critical difference grade.

<sup>6</sup> The “2” is the critical difference grade.

<sup>7</sup> Western Regional Examining Board, “1999 Dental Candidate Guide” (Phoenix: October 1998), p. 4.

<sup>8</sup> The characterization of a grade as “right” or “wrong” seems more appropriate during a standardization session since standardization relies on the opinion of a higher authority (*e.g.*, the calibrator or the members of an operative committee). It seems less appropriate during an examination setting since grading examiners are peers and there is no higher authority to speak of once grading begins.

<sup>9</sup> The Bureau confirmed the existence of “2”, “3”, “5” and “0”, “2”, “3” test results. Interview with Ms. Jodi Leandro, Licensing Examiner, Department of Commerce and Consumer Affairs, Professional and Vocational Licensing Division, Examination Branch, October 27, 1999.

<sup>10</sup> As discussed in Chapter 2, grading is done on a six-point scale ranging from “0” to “5”, with “0” being characterized as “highly unsatisfactory (critical errors)”, “1” being characterized as “unsatisfactory (gross errors)”, “2” being characterized as “minimally unsatisfactory (marked errors)”, “3” being characterized as “minimally satisfactory (moderate errors)”, “4” being characterized as “satisfactory (slight errors)”, and “5” being characterized

as “ideal”. A grade of “0”, “1”, or “2” is considered a failing grade—or “below the line”; a grade of “3”, “4”, or “5” is considered a passing grade—or “above the line”.

As also discussed in Chapter 2, it is not necessary to pass each test or part of a test.

<sup>11</sup> Western Regional Examining Board, “1999 Dental Candidate Guide” (Phoenix: October 1998), pp. 4 and 18-19.

Western Regional Examining Board, “Amalgam Preparation Gradesheet” (Form No. F-10702-WREB)(Phoenix: 1997), 1 p.

The Hawaii dental licensing examination divides the grading of a class II amalgam preparation into the following three areas: “external outline (form)”, “internal form/pulpal protection”, and “cavity refinement”. Chapter 16-79, Hawaii Administrative Rules (Department of Commerce and Consumer Affairs; Dentists and Dental Hygienists), p. A-4.

<sup>12</sup> The Western Regional Examining Board uses the following scales to convert a candidate’s grade (*e.g.*, “0”, “1”, “2”, “3”, “4”, “5”) in each area of a class II amalgam preparation to a points-based scoring system. The maximum number of points a candidate can receive on a class II amalgam preparation is 15.00; a minimum of 70.00 points are necessary to pass the Western Regional Examining Board’s exam.

**Outline and Extension**

Grade	Percentage of Points Received	Maximum Points	Points Received
5	100.00%	6	6.00
4	85.00%	6	5.10
3	70.00%	6	4.20
2	46.67%	6	2.80
1	23.33%	6	1.39
0	0.00%	6	0.00

**Internal Form**

Grade	Percentage of Points Received	Maximum Points	Points Received
5	100.00%	6	6.00
4	85.00%	6	5.10
3	70.00%	6	4.20
2	46.67%	6	2.80
1	23.33%	6	1.39
0	0.00%	6	0.00

**Operative Environment and Pulp Protection**

Grade	Percentage of Points Received	Maximum Points	Points Received
5	100.00%	3	3.00
4	85.00%	3	2.55
3	70.00%	3	2.10
2	46.67%	3	1.40
1	.33%	3	0.69
0	0.00%	3	0.00

Interview with Ms. Linda Paul, Executive Director, Western Regional Examining Board, October 14, 1999.

## Chapter 4

### OBSERVATIONS—THE EXPERT AND THE INCIDENTAL OBSERVER

#### Scope and Organization of this Chapter

Part I of this chapter discusses the impartial observer's report to the Department of Commerce and Consumer Affairs concerning the administration of the February 24-26, 1995, and August 11-13, 1995, dental licensing examinations. Part II discusses the Bureau's observations concerning the administration of the August 13-15, 1999, dental licensing examination. The Bureau observed the examiner standardization session conducted on August 13, 1999, and the grading of the six performance-based tests administered on August 14-15, 1999.<sup>1</sup> The Bureau chose not to observe the administration of the two multiple-choice tests since the examiner standardization session was being conducted at the same time in another location across town.

Because it is easy to confuse the terms "standardization", "calibration", "orientation", "examiner", and "calibrator" and what each represents, this study uses the following naming conventions, which were adapted from the "Guidelines for Examiner Standardization":<sup>2</sup>

"Standardization" refers to an educational process to establish consistency among examiners with established criteria, guidelines, or standards. The term includes both the orientation and calibration of examiners.

"Calibration" refers to a process designed to measure the extent to which examiner standardization has occurred. Additionally, the degree to which several judges identify the same level of correctness for a given clinical performance or the degree to which a single judge identifies the same level of correctness for the same clinical performance over several examinees. Colloquially, the term has been used in dentistry to denote the process to train examiners to grade according to pre-established criteria.

"Orientation" refers to activities designed to inform examiners about (1) their roles, duties, and responsibilities, (2) the administrative procedures to be followed during the examination, and (3) the scoring system and grading (*rating*<sup>3</sup>) criteria to be used during the examination.

"Examiner" (*or grader*<sup>4</sup>) refers to an individual who evaluates a candidate's performance on a clinical procedure. The term does not refer to a member of the Board of Dental Examiners unless the member evaluates a candidate's performance on a clinical procedure.

"Calibrator" refers to an individual who conducts the training session (standardization) designed to calibrate the individuals who will serve as examiners during a clinical examination.

Overly simplified, the purpose of standardization and the role of the calibrator are to (1) establish consistency among potential examiners,<sup>5</sup> and (2) verify the existence of this consistency by testing an examiner's ability to adhere to and apply the grading (rating) criteria.<sup>6</sup>

## **Part I: The Impartial Observer's Report**

### **Background**

Section 16-79-115(d) of the administrative rules of the Department of Commerce and Consumer Affairs (Dentists and Dental Hygienists) requires the Department to appoint an impartial observer to monitor two consecutive dental licensing examinations at least once every five years. An impartial observer will be monitoring the February and August 2000 dental licensing examinations.<sup>7</sup>

The principal duty of the impartial observer is to determine whether or not the dental licensing examinations were conducted in accordance with chapter 16-79, Hawaii Administrative Rules, which specifies the requirements for anonymity, reliability, validity, and content. The impartial observer must be a dentist who is appointed to the faculty of a college of dentistry and who has demonstrated knowledge and experience in dental examination testing.

The impartial observer for the February 24-26, 1995, and August 11-13, 1995, dental licensing examinations was Frank J. Courts, D.D.S., and Ph.D., of the University of Florida College of Dentistry. Dr. Courts assisted the late A. Lewis Leo, D.M.D., Associate Dean of the University of Florida College of Dentistry and the court's master appointed as a result of the *Pekarsky* litigation (see Chapter 1), with the preparation of the master's reports to the United States District Court for the District of Hawaii. Dr. Leo was instrumental in developing the state-constructed dental licensing examination that is being used today. The highlights of the impartial observer's report are discussed below.<sup>8</sup> The unedited text of the impartial observer's report is included in this report as Appendix B.

### **Findings, Conclusions, and Recommendations of the Impartial Observer**

#### **Candidate examination materials**

*The candidate examination materials were found to be excellent.* The instructions to the candidates were complete and well written and extremely thorough. They adequately detailed the guidelines of the examination and all pre-examination preparation for the candidates, and reflected an ongoing effort to maintain current information regarding the examination process.

**Grader<sup>9</sup> standardization and calibration sessions**

*The quality of the overall standardization/calibration process was judged to be excellent.* The standardization process was thorough and of the highest quality. The calibrator for the examinations (Robert Christoffersen, D.D.S., and a faculty member from the University of the Pacific School of Dentistry)<sup>10</sup> did an exceptional job and had the full participation of Board members and graders.

A criterion-based scoring system was used as the basis for the evaluation of all clinical procedures that would be graded in the examination. The calibration examination was scored in conjunction with the potential graders, and those graders who fell outside the limits of critical differences were eliminated from grading the subsequent practical examination.

**Written and differentiation examinations**

The content of the written examination was found to be current and reflected an examination of minimal competency.

The differentiation examination in the area of prosthodontics remains unchanged from the 1990 examination. The Board should periodically review the differentiation examination for contemporary content in the area of prosthodontics.

**Practical examination process**

*The administration of the practical examination was found to be of exceptional high quality.* Board members and staff exercised judgment, effort, and extreme care to administer an examination of the highest quality. All Board members were extremely knowledgeable of the examination process and had a genuine concern to conduct an examination of the highest quality.

The graders who were selected were well prepared and showed a high level of professionalism. The staff of the Examination Branch was aware of all examination rules and requirements, was extremely helpful to all individuals involved in the examination, and provided continuity to a very time-constrained and complex examination.

All individuals involved in administration of the examinations were observed to be helpful and respectful to the candidates.

*Both examinations were conducted in an anonymous fashion.* All clinical grading was conducted in a professional manner. Interaction between graders was minimal and grades were arrived at in an independent manner by all graders. No evidence of collusion by examination personnel was observed.

*Many candidates did not appear to be adequately prepared to take a licensure examination.* In general, patient selection was poor and many candidates appeared unfamiliar with the pre-examination instructions that were provided to them.

*The facilities at the Naval Dental Clinic are not well suited for a practical dental examination process.* The organization of the Board and the staff associated with this group, however, compensated in a quality manner. Technical support staff from the Naval Dental Clinic assured that the dental facilities did not compromise the examination process for any candidate

**Post examination analysis  
(testing reliability)**

*The post-examination analysis report prepared by the Department of Commerce and Consumer Affairs' Examination Branch was found to be of high accuracy and quality.* The pass rates for the examinations and individual components were clear and accurate. The mean scores, frequency distribution data, and critical difference analyses were accurate and reflected a careful effort by the staff of the Examination Branch.

Several minor modifications in the reporting format may assist the Board in maintaining the reliability of the examination process. The first modification is to use the critical difference analysis to evaluate grading reliability of individual components of the practical examination. A critical difference analysis of the full crown wax up from the February 1995

and August 1995 examinations would have indicated a problem in grading reliability. The second modification is to evaluate graders prior to elimination of critically differing grades to more accurately reflect any adverse grading trends in average grade and frequency distribution.

**Examination content  
(content validity)**

*The examination content was found to adequately address the scope of general dentistry. The Board should periodically evaluate the examination content to assure that the examination remains contemporary with the current practice of dentistry.*

Any statutory limitation restricting updating the content of the examination should be addressed to assure the future quality of the examination. For the examination to remain excellent, it must stay in step with contemporary dentistry. Every attempt should be made to assure the Board possesses adequate flexibility to meet the challenge of licensure in an ever-changing dental profession.

The Board should consider (1) eliminating the full crown wax-up, since damage frequently occurs to the pattern during grading and standardization for the grading of this component appears difficult to achieve,<sup>11</sup> (2) adding a nonpatient examination of periodontal diagnosis and treatment planning, and (3) eliminating either the laboratory class II amalgam preparation<sup>12</sup> or the clinical class II amalgam restoration, which are redundant, to reduce examination time and candidate stress.

**General observations**

The competency level of candidates who take the Hawaii dental licensure examination appears to be low in comparison to other candidate pools that the impartial observer is familiar with. The historic pass rate on the examination seems to accurately reflect the reduced level of minimal competency in candidates for the Hawaii examination.

*There was no evidence that the Board has engaged in behaviors that would exclude competent practitioners of dentistry from obtaining licensure in the State of Hawaii.*

The Board should consider excluding its members from the examination grading process in order to (1) allow candidate results to be reviewed by Board members without previous bias, and (2) remedy problems with individual examination grader performances more easily.

Any grader of an examination component should grade at least ten occurrences of that component in order to reflect any abnormal grading trends.

## Summary

*The examination process observed during the administration of the clinical examination compares very favorably with six other independent state boards of dentistry that the impartial observer has direct knowledge of.* The impartial observer found no major deficiencies and only several minor difficulties that are easily remedied. The Board should be commended for the high quality of its examination process.

(The Bureau would be remiss if it did not also mention the final conclusions from Dr. Leo's October 26, 1990, report to the United States District Court, in which he stated:<sup>13</sup>

The August 1989, February 1990 and August 1990 Hawaii dental examinations were the best in quality, reliability, validity, and professionalism of any I have observed over the past twenty years. The Hawaii Dental Examination currently is the most broad based and thoroughly validated evaluation that exists today. These observations are based on the following evidence. . . .

The unedited text of the final conclusions from Dr. Leo's report is included in this report as Appendix C. Although Dr. Leo's conclusions may be dated, they serve to illustrate the high esteem in which the dental licensing examination was held at the time the report was issued.)

## Part II: The Bureau's Observations

### Candidate Examination Materials

**Findings and discussion.** The candidate examination materials that are provided to each candidate prior to the examination do not disclose all the criteria that are used by an examiner to rate a candidate's performance. For example, proximal extensions for the preparation part of the class II amalgam test, which are measured in fractions of a millimeter, can be awarded specific ratings by an examiner. More specifically and to the point, proximal extensions of (blank) to "X" mm<sup>14</sup> are considered "ideal" and can be awarded a grade of "5". Similarly, proximal extensions of (blank) to "Z" mm are considered acceptable (*i.e.*, ideal, satisfactory, or minimally satisfactory) and can be awarded at least a passing grade of "3", if not more. This specific information is not disclosed in the candidate examination materials or included in Appendix A of chapter 16-79, Hawaii Administrative Rules, but is given to an examiner during a standardization session. (Whether or not the information given to an examiner during a standardization session constitutes a rule for purposes of the Hawaii Administrative Procedure Act<sup>15</sup> is not the main issue here.)

The reader is urged to keep in mind that proximal extensions are only one of eleven different criteria used to grade a class II amalgam preparation. Proximal extensions are used as an example in this part only because they lend themselves to measurement, which in turn makes it easier for the layperson to understand the point of this discussion. Proximal extensions are no more and no less important than the other ten criteria used to grade a class II amalgam preparation (except those criteria requiring a mandatory grade of "0").

As previously mentioned in Chapter 2, high and low ratings on the class II amalgam preparation are not averaged because the Board believes that the integrity of a class II amalgam restoration is only as good as the weakest part of its preparation, which includes proximal extensions. It should be noted, however, that each grade earned by a candidate on a test or part of a test reflects the lowest rating that was awarded to the candidate by an examiner, which includes proximal extensions.

A candidate who fails the dental licensing examination (or the restorative technique examination) and who requests an informal examination review,<sup>16</sup> has the opportunity to learn these ratings criteria if the candidate requests the information.<sup>17</sup> A candidate who requests an informal examination review has the opportunity to also learn how proximal extensions, which are too small to be measured directly with a periodontal probe,<sup>18</sup> can be measured indirectly using other common dental instruments (*e.g.*, the tine of an explorer<sup>19</sup>).

Should a candidate have to fail the dental licensing examination or rely on second-hand information from friends or colleagues in order to learn these ratings criteria or indirect measuring techniques? Is it fair for some candidates to have this information and for other candidates not to? These are questions of public policy that the Legislature can answer without usurping the role of the Board. On the other hand, ratings criteria such as proximal extensions are technical requirements intended to be used by dentists rather than laypeople.

The dental licensing examination is a test of a candidate's clinical judgment.<sup>20</sup> Being a test of judgment, the acceptability of a class II amalgam preparation cannot be graded solely on the basis of its conformance to prescribed dimensions and angles. In fact, a great deal of dentistry depends on a dentist's ability to recognize what may or may not compromise the integrity of a tooth or restoration (*i.e.*, filling).<sup>21</sup> While giving a candidate access to the same information that is given to an examiner might lead to a challenge based solely on the preparation's conformance to prescribed dimensions and angles, such a challenge may be an indication that the candidate lacks an acceptable level of clinical judgment and should not be licensed to practice dentistry. Prescribed dimensions and angles aside, it is the task of examiners to determine whether or not a candidate is "minimally competent to practice dentistry independently and safely".<sup>22</sup>

Giving a candidate access to the same information that is given to an examiner might largely eliminate the claim that the candidate failed the dental licensing examination because the candidate did not know what the examiner was looking for. Whether or not this claim is legitimate is beyond the scope of this study, as is the issue of whether or not a candidate should be allowed to use an informal examination review to learn how to pass the dental licensing examination. It should be noted, however, that the Western Regional Examining Board provides candidates with the acceptable range for proximal and gingival extensions (*i.e.*, approximately 0.5 mm to 1 mm). The abovementioned range appears to differ, at least on face value, from the acceptable range for proximal extensions given to an examiner during a standardization session for the state-constructed dental licensing examination. More importantly, Hawaii and the Western Regional Examining Board appear to differ on the upper limit of what constitutes acceptable proximal extensions (*e.g.*, approximately 1 mm for the Western Regional Examining Board).<sup>23</sup> Whether or not these differences are due to variations in measuring techniques is unclear and beyond the scope of this study. The point of this discussion is that, at least on face value, the ranges are different.

**Suggestions.** The Board may want to consult with the Attorney General to determine whether or not the information given to an examiner during a standardization session constitutes a rule that is subject to the rulemaking requirements of the Hawaii Administrative Procedure Act, and whether or not this information can be included in the candidate handbooks (*i.e.*, *Instructions and Information for the Hawaii Dental Licensure Examination* and *Instructions and Information for the Non-Accredited School Examination*) by rule. Including this information in the candidate handbooks by rule would allow the Board to keep the dental licensing examination current without having to go through the lengthy rulemaking process each time substantial advances in dental materials or techniques occur. Publishing this information in the candidate handbooks, however, would not eliminate the need for rulemaking if it is required by the Hawaii Administrative Procedure Act.

### **Examiner<sup>24</sup> Standardization Session**

**Findings and discussion.** Subsequent to the administration of the dental licensing examination, the calibrator informed the Bureau that four potential examiners did not initially meet the qualifying standard for critical difference grades specified in section 16-79-100(c),

Hawaii Administrative Rules.<sup>25</sup> While the failure of four potential examiners to meet the qualifying standard was unprecedented according to the calibrator, it was not entirely unexpected since the Board does not have a permanent pool of trained, experienced examiners.<sup>26</sup> As pointed out by Dr. Leo, “[g]rading techniques are a learning process and with guidance and training most individuals can master the problem”. [emphasis added]<sup>27</sup>

The calibration examination was re-scored (by rendering certain exam items moot) following discussions between the calibrator and potential examiners regarding the numbers of critical difference grades that were awarded on certain exam items. According to the calibrator, the calibration examination was re-scored because not enough potential examiners had initially passed the examination and because chapter 16-79, Hawaii Administrative Rules, does not contain specific procedures for handling situations where there are not enough qualified examiners to administer a dental licensing examination.<sup>28</sup> Based on the requirements of chapter 16-79, Hawaii Administrative Rules, it appears to take at least eight qualified examiners to administer a dental licensing examination.<sup>29</sup> Although a dental licensing examination could be administered with as few as four qualified examiners,<sup>30</sup> the calibrator would have to return to Hawaii following the examination, at a cost of \$2,500,<sup>31</sup> in order to calibrate the remaining four examiners.<sup>32</sup>

It seems reasonable, for training and verification purposes, to review the reasons why critical difference grades were awarded on certain exam items. For example, the order or appearance, or both, of the cast stone and wax pattern models used to calibrate potential examiners could have changed while the models were being passed around and across the room. Re-scoring the calibration examination because not enough potential examiners passed the examination, however, seems inconsistent with the purpose of standardization and the role of the calibrator, which are to (1) establish consistency among potential examiners,<sup>33</sup> and (2) verify the existence of this consistency by testing a potential examiner’s ability to adhere to and apply the grading (rating) criteria.<sup>34</sup> Asking potential examiners, which by necessity includes a few board members (see **General observations** above and **Miscellaneous observations** below), to redefine the practice of contemporary dentistry during a standardization session is a questionable practice because it gives the examiners a hand in determining the answers to the questions on the calibration examination.

In one instance, the calibrator deferred to the Board members present at the standardization session for a decision concerning the operational definition of a rating criterion.<sup>35</sup> While a majority of the dentist-members of the Board were present at the standardization session, this may not always be the case in the future if the Board is successful in finding more dentists who are willing to serve as grading and nongrading examiners. According to the Chairperson of the Board, however, dentist-members of the Board are highly encouraged to attend all the standardization sessions.<sup>36</sup> At the very least, these issues should be brought before a majority of the dentist-members of the Board, meeting in executive session, preferably before or after the standardization session, for discussion with the calibrator.

In fairness to the calibrator, it should be noted that:

- (1) Chapter 16-79, Hawaii Administrative Rules, does not contain specific procedures (*e.g.*, remedial training and retesting<sup>37</sup>) for handling situations where there are not enough qualified examiners to initially administer a dental licensing examination;
- (2) The standardization of potential examiners may have been adversely influenced by the presence of the observer from the Bureau—the so-called “Hawthorne Effect”, where the act of observing a phenomenon changes the phenomenon itself;<sup>38</sup>
- (3) The 3-dimensional cast stone and wax pattern models used to calibrate potential examiners are subject to wear-and-tear as they are repeatedly handled and occasionally mishandled (*e.g.*, dropped on the floor or the table), which can change their appearance in minute but meaningful ways;
- (4) Chapter 16-79, Hawaii Administrative Rules, does not prohibit the Board from redefining the practice of contemporary dentistry during a standardization session; and
- (5) The Board rejected the impartial observer’s recommendation to change the critical difference grade cut-off from thirteen percent to eighteen percent, which would have made it less difficult to retain potential examiners.<sup>39</sup>

In 1996, the impartial observer informed the Board that the thirteen percent cut-off might make it difficult to retain potential examiners, since the figure was based historically on experience with boards that had failure rates between ten and twenty percent.<sup>40</sup> (In contrast, the failure rate of United States and Canadian dental school graduates on the state-constructed dental licensing examination is around forty-six percent. See Chapter 5.) The Board, however, rejected the impartial observer’s recommendation in order to set a higher standard for the examiners and to have a stronger defense of the examination.<sup>41</sup> According to the calibrator, if the Board had accepted the impartial observer’s 1996 recommendation to change the critical difference grade cut-off from thirteen percent to eighteen percent, there initially would have been enough qualified examiners to administer the August 1999 dental licensing examination.<sup>42</sup>

It is the responsibility of the Board, not the calibrator, to ensure that there are enough qualified examiners to administer a dental licensing examination.<sup>43</sup> Allowing the calibrator to assume this administrative responsibility could undermine the calibrator’s credibility and, with it, the validity and reliability of the dental licensing examination. In addition, it denies the Board the opportunity to address the problem immediately and for the future. (Conversely, it enables the Board to temporarily put off addressing the problem.) The calibrator, not potential examiners, should define the practice of contemporary dentistry during a standardization session. Asking potential examiners to redefine the practice of contemporary dentistry during a standardization session could undermine the examiners’ credibility and, with it, the validity and reliability of a dental licensing examination.

In fairness to the Board, it should be noted that grading a single dental licensing examination (*e.g.*, August 1998) can require up to five full days, including two weekends (*i.e.*,

Saturday and Sunday, August 8-9<sup>th</sup> and 15-16<sup>th</sup>) and one day for examiner standardization (*i.e.*, Friday, August 7<sup>th</sup>).<sup>44</sup> In addition, contested case hearings and other legal proceedings requiring an examiner to appear as a witness can consume an unspecified number of business (*i.e.*, revenue earning) days and disrupt patient treatment. Finally, examiners receive an honorarium of only \$45 per day for the whole day.<sup>45</sup> Dental licensing examinations have ended as late as 7:30 p.m. to ensure that no candidate was disadvantaged by the amount of time the candidate's patient spent in the grading area and out of the operatory.<sup>46</sup> Neighbor island Board members who serve as examiners also receive a *per diem* of \$80; neighbor island examiners who are not Board members do not receive a *per diem*.<sup>47</sup> In comparison, the North East Regional Board of Dental Examiners pays its examiners a *per diem* of \$75 and an honorarium of \$200 per day of actual examining; and the same *per diem* and an honorarium of \$150 per day for examiner standardization.<sup>48</sup> (Note: On Monday, November 15, 1999, the Board of Dental Examiners recommended that the Department of Commerce and Consumer Affairs increase the honorarium from \$45 to \$150. The Department of Commerce and Consumer Affairs must approve the increase.<sup>49</sup>)

### **Suggestions.**

- (1) The Board, with the assistance of the Department of Commerce and Consumer Affairs, should consider (re)establishing a permanent pool of trained, experienced examiners to ensure that there are enough qualified examiners to administer a dental licensing examination. According to the *Guidelines for Examiner Standardization*, “[a]gencies should attempt to retain a sufficient percentage of previous examiners (a minimum of 80% is suggested) to ensure that turnover is kept within an acceptable range”.<sup>50</sup>
- (2) The Board should reconsider adopting the impartial observer's specific recommendation to change the critical difference grade cut-off from thirteen percent to eighteen percent in order to make it less difficult to retain potential examiners.
- (3) The Board should consult with the Attorney General to determine whether or not its dentist-members can make decisions as a board during a standardization session and still comply with the requirements of the “Sunshine Law”.<sup>51</sup>

### **Practical Examination Process**

**Anonymity between grading examiners and candidates; findings and discussion.** The dental licensing examination and the restorative technique examination seemed to be conducted in a manner intended to preserve anonymity between the grading examiners and the candidates. The examiners did not discuss their grades with one another, with the candidates, with the candidates' patients, or with the observer from the Bureau. Conversations between examiners and patients were limited to simple greetings and inquiries about the patients' physical comfort (*e.g.*, pain and cold). The nongrading supervisor of examiners (or graders) conducted discussions concerning specific situations away from the candidates and patients. The examiners

did not make disparaging or disrespectful remarks about the candidates' work, even though the failure rate for this dental licensing examination would eventually turn out to be quite high.<sup>52</sup> The Bureau would be remiss if it did not mention that the procedures for ensuring anonymity between the grading examiners and the candidates seemed to be well thought out and executed by the Board, the Department, the examiners, and the many volunteer and paid personnel involved with the administration of the examinations.

**Assignment of examiners to grading teams; findings and discussion.** In February 1997,<sup>53</sup> the Examination Branch began randomly assigning examiners to grading teams in order to guard against the possible introduction of bias—or systematic error—caused by examiners assigning themselves to grading teams. This kind of error would have been difficult to detect since examiners who graded alike, but in a biased manner, would not have appeared to be awarding an excessive number of critical difference grades in the post-examination analysis conducted by the Examination Branch.

**Anonymity of foreign dental school graduates; findings and discussion.** Because the restorative technique examination is conducted on ceramic teeth mounted in a mannequin, grading examiners almost certainly know whether a candidate is a United States or foreign dental school graduate. (For the purposes of this chapter, the term “United States dental school graduates” includes Canadian dental school graduates.) More specifically, the restoration part of the class II amalgam test,<sup>54</sup> and the preparation and restoration parts of the class III/IV composite test are conducted on a mannequin for the restorative technique examination rather than on a live patient. Whether or not examiners actually care about where a candidate was educated is another matter entirely and beyond the scope of this study. The Bureau, however, did not observe any discussions between examiners regarding the quality of work performed by foreign dental school graduates.

The only way to simultaneously (1) ensure anonymity about where a candidate was educated, (2) protect the health, safety, and welfare of patient volunteers, and (3) license foreign dental school graduates, is to eliminate the use of live patients on the dental licensing examination. Eliminating the use of live patients would allow the Board to eliminate the restorative technique examination and continue the licensing of foreign dental school graduates. It should be noted, however, that in March 1997 the General Assembly of the American Association of Dental Examiners called on the association to (1) recognize the lack of an adequate substitute for human subjects in some aspects of clinical dental testing, and (2) support the continued monitoring and accepting, when possible, of valid and reliable substitutes for human subjects in clinical examinations.<sup>55</sup>

Among the twelve items on the *Agenda for Change in the Clinical Licensure Examination Process* developed at the 1997 Invitational Conference for Dental Clinical Testing Agencies, is: “[m]inimize the use of human subjects in clinical licensure examinations, but where human subjects are used, ensure that the safety and protection of the patient is of paramount importance and that patients are procured in an ethical manner”.<sup>56</sup> It should be noted, however, that the American Dental Association/American Association of Dental Examiners’ *Guidelines for Valid and Reliable Dental Licensure Clinical Examinations* (May 1992) recommends that the class II amalgam test be performed on a patient.<sup>57</sup> Interestingly, the

*Guidelines* states that periodontics, including root planing and treatment planning, “must be performed on a patient”.

**Assignment of examiners to grading teams; suggestions.** The Board should consider amending chapter 16-79, Hawaii Administrative Rules, to require the random assignment of examiners to grading teams in order to guard against the possible introduction of bias caused by examiners assigning themselves to grading teams. This would codify existing practices now being implemented by the Examination Branch.

**Anonymity of foreign dental school graduates; suggestions.** The Board should consult with the Attorney General to determine whether or not the ability of grading examiners to identify foreign dental school graduates taking the restorative technique examination as a class is consistent with the principles of anonymous testing even though it may not violate state or federal law.<sup>58</sup>

### **Examination Content (Content Validity)**

**Status of the impartial observer’s recommendations; findings and discussion.** Although the impartial observer recommended in May 1996 that the Board (1) eliminate the wax pattern part of the full crown test, (2) add a nonpatient examination of periodontal diagnosis and treatment planning, and (3) eliminate either the class II amalgam preparation test on the mannequin or the class II amalgam restoration test on the patient, none of these recommendations has been incorporated into chapter 16-79, Hawaii Administrative Rules, to date.

The Board did not accept the impartial observer’s recommendation to eliminate the wax pattern part of the full crown test.<sup>59</sup> The Board voted in June 1998 to eliminate the class II amalgam preparation test on the mannequin.<sup>60</sup> The Board is actively exploring the nonpatient examination of periodontal diagnosis and treatment planning developed by the North East Regional Board of Dental Examiners and administered by Sylvan Technology Centers.<sup>61</sup>

**Use of errata sheet to purportedly amend rules; findings and discussion.** Because of the public notice and hearing requirements imposed by the rulemaking process, several errors in the grading (rating) criteria for the dental licensing examination have not been corrected through the rulemaking process. Section 16-79-105(d), Hawaii Administrative Rules, makes these grading (rating) criteria part of this section and chapter 16-79 and, in effect, rules.<sup>62</sup> These corrections are listed on a separate errata sheet, which is included in the candidate handbooks, *Instructions and Information for the Hawaii Dental Licensure Examination* (August 1999) and *Instructions and Information for the Non-Accredited School Examination* (August 1999). The errata sheet and the amendments it purports to make are not part of the official rules filed with the Office of the Lieutenant Governor.<sup>63</sup> As the so-called “corrections” have never been adopted through the rulemaking process, it would appear that the Board cannot validly apply them.

**Use of errata sheet to purportedly amend rules; suggestions.** The Board should consult with the Attorney General to determine:

- (1) Whether or not the use of an errata sheet to purportedly amend chapter 16-79, Hawaii Administrative Rules, complies with the Hawaii Administrative Procedure Act; and
- (2) If not, what impact, if any, this action would have upon any results of the dental licensing examination.

**Substitution of grades if anonymity has been breached; findings and discussion.** Section 16-79-111(b), Hawaii Administrative Rules, requires the Board to regrade an examination if anonymity has been breached by substituting (a) the grades obtained by a candidate for the preparation part of the class II amalgam test on the mannequin for (b) the grades obtained by the candidate on the preparation part of the class II amalgam test on the patient or the preparation part of the class III/IV composite test on the patient.<sup>64</sup> In order to substitute (a) the grades for the preparation part of the test on the mannequin for (b) the grades for any other procedure on the dental licensing examination, it could be argued that there should be a reasonably strong, positive correlation between the grades for each procedure. For example, there should be a reasonably strong, positive correlation between the grades obtained by a candidate for the preparation part of the class II amalgam test on the mannequin and the grades obtained by the candidate for the preparation part of the class II amalgam test on the patient. While a perfect, positive correlation (*i.e.*, +1.00) would be ideal,<sup>65</sup> there are very few “real world” examples of perfect correlations between variables.<sup>66</sup>

An analysis of 229 pairs of scores from the February 1995 dental licensing examination to the February 1999 dental licensing examination indicates that grades for the preparation part of the class II amalgam test on the mannequin are only slightly correlated to grades for the preparation part of the class II amalgam test on the patient ( $\rho = +0.23$ ). To be included in this analysis:

- (1) A candidate had to have at least two grades for the preparation part of the test on the patient and the preparation part of the test on the mannequin. A zero (“0”) was considered a grade; a blank or mechanical pulp exposure was not considered a grade;<sup>67</sup> and
- (2) The scores on the tests had to be from the same examination (*e.g.*, February 1999). Scores from a partial retake of the dental licensing examination were included as long as they were all from the same examination.

Regardless of the reasons for the observed population correlation, the data seem to suggest that substituting (a) the grades obtained by a candidate for the preparation part of the class II amalgam test on the mannequin for (b) the grades obtained by the candidate for the preparation part of the class II amalgam test on the patient, may not be appropriate. Because of peculiarities in the system used to score a test, including a part of a test, (see Chapters 2 and 3) these findings should not be used to justify the elimination of mannequin-based procedures (*i.e.*, procedures performed on ceramic teeth mounted in a mannequin) in clinical licensure examinations. The lack of a reasonably strong, positive correlation could have something to do

with the fact that suppressing a critical difference grade makes it mathematically impossible for a candidate to earn a score that is greater than 2.000 but less than 3.000 on a one-part test or any part of a two-part test. These findings are illustrated below in Chart 1.<sup>68</sup>

As previously mentioned, the Board voted in June 1998 to eliminate the class II amalgam preparation test on the mannequin.<sup>69</sup> The abovementioned analysis should lend weight to the Board's decision.

### **Miscellaneous Observations**

Although the impartial observer recommended that the Board consider excluding its members from the grading process, the lack of sufficient numbers of qualified examiners—as opposed to the Board's resistance or failure to adopt the necessary rules—has prevented the implementation of this recommendation.<sup>70</sup>

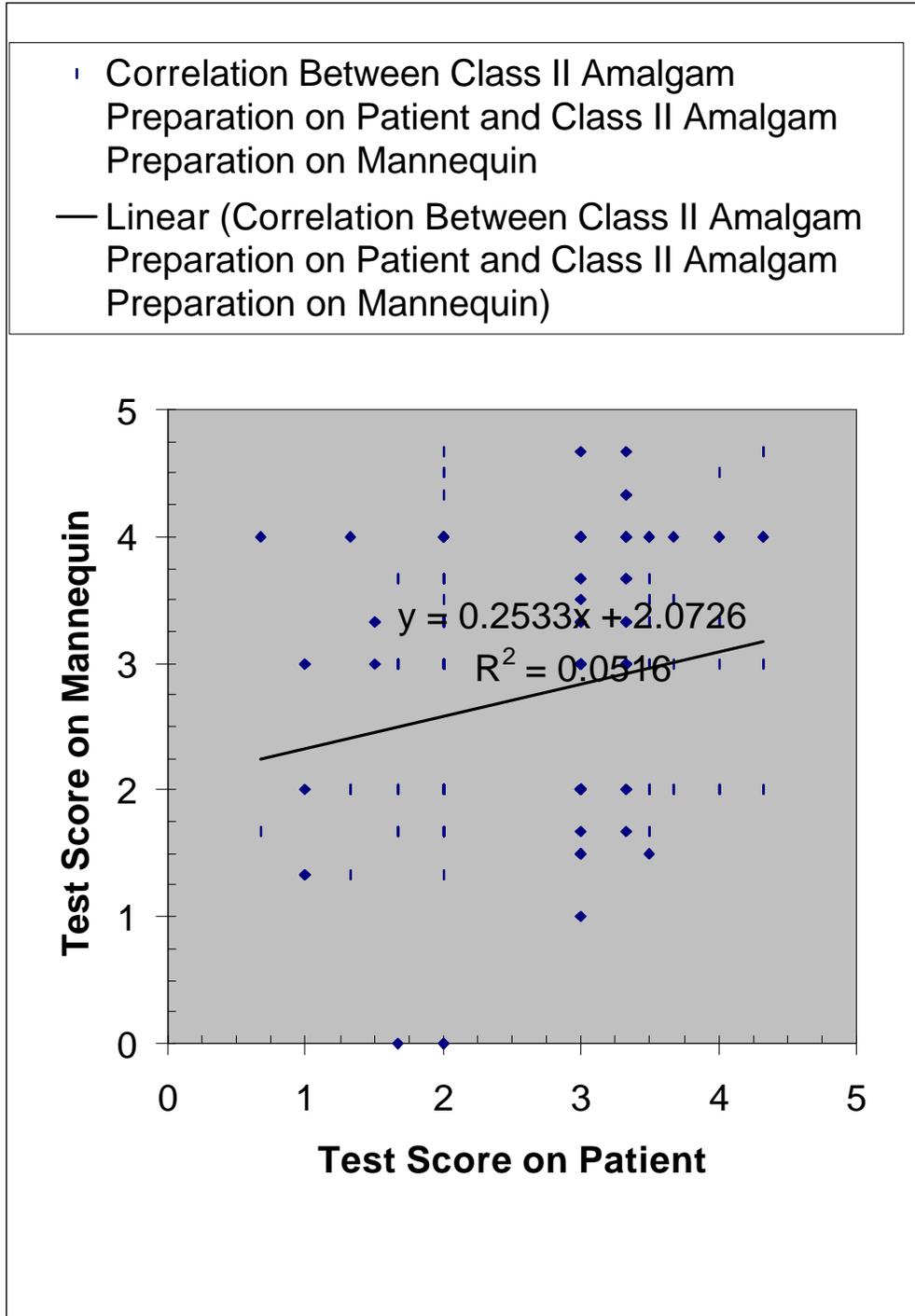
Consistent with the impartial observer's recommendation, the Board should consider excluding its members from the examination process once there are enough qualified examiners to handle the grading process and enough qualified dentists to perform the responsibilities of clinical floor coordinator, simulation floor coordinator, and supervisor of examiners (or graders). Section 16-79-93, Hawaii Administrative Rules, allows the Board to designate qualified dentists who are not board members to perform the responsibilities of clinical floor coordinator, simulation floor coordinator, and supervisor of examiners.<sup>71</sup>

### **Summary of the Bureau's Observations**

**Candidate examination materials.** The candidate examination materials that are provided to each candidate prior to the examination do not disclose all the criteria that are used by an examiner to rate a candidate's performance. Giving a candidate access to the same information that is given to an examiner might largely eliminate the claim that the candidate failed the dental licensing examination because the candidate did not know what the examiner was looking for.

**Examiner standardization session.** According to the calibrator for the August 1999 dental licensing examination, the calibration examination was re-scored because not enough potential examiners had initially passed the calibration examination and because chapter 16-79, Hawaii Administrative Rules, does not contain specific procedures for handling situations where there are not enough qualified examiners to administer a dental licensing examination. According to the calibrator, if the Board had accepted the impartial observer's 1996 recommendation to change the critical difference grade cut-off from thirteen percent to eighteen percent, there initially would have been enough qualified examiners to administer the August 1999 dental licensing examination.

**Chart 1: Class II Amalgam Preparation; Patient versus Mannequin**



**Anonymity between grading examiners and candidates.** The procedures for ensuring anonymity between the grading examiners and the candidates seemed to be well thought out and executed by the Board, the Department, the examiners, and the many volunteer and paid personnel involved with the administration of the examinations.

**Assignment of examiners to grading teams.** In February 1997, the Examination Branch began randomly assigning examiners to grading teams in order to guard against the possible introduction of bias—or systematic error—caused by examiners assigning themselves to grading teams. This kind of error would have been difficult to detect in the post-examination analysis conducted by the Examination Branch.

**Anonymity of foreign dental school graduates.** Because the restorative technique examination is conducted on ceramic teeth mounted in a mannequin, grading examiners almost certainly know whether a candidate is a United States or foreign dental school graduate. The Bureau, however, did not observe any discussions between examiners regarding the quality of work performed by foreign dental school graduates.

**Status of the impartial observer’s recommendations.** Although the Board voted to (1) explore the addition of a nonpatient examination of periodontal diagnosis and treatment planning to the dental licensing examination, and (2) eliminate the class II amalgam preparation test on the mannequin, neither of these decisions has been incorporated into chapter 16-79, Hawaii Administrative Rules, to date.

**Use of errata sheet to purportedly amend rules.** Because of the public notice and hearing requirements imposed by the rulemaking process, several errors in the grading (rating) criteria for the dental licensing examination have not been corrected through the rulemaking process. Instead, corrections are listed on a separate errata sheet, which is included in the candidate handbooks. As the so-called “corrections” have never been adopted through the rulemaking process, it would appear that the Board cannot validly apply them.

**Substitution of grades if anonymity has been breached.** The data seem to suggest that substituting (a) the grades obtained by a candidate for the preparation part of the class II amalgam test on the mannequin for (b) the grades obtained by the candidate for the preparation part of the class II amalgam test on the patient, may not be appropriate. This finding should lend weight to the Board’s decision to eliminate the class II amalgam preparation test on the mannequin.

## Endnotes

<sup>1</sup> The Bureau observed the entire examiner standardization session, which was conducted at the office of the Hawaii Dental Association on Friday, August 13, 1999, from 8:00 a.m. to 3:00 p.m. The Bureau observed the entire (*i.e.*, eleven hours) grading of the six performance-based tests administered at the Pearl Harbor Naval Dental Center on Saturday, August 14, 1999, from 6:45 a.m. to 5:00 p.m., and the first half (*i.e.*, five hours) of the grading of the same six performance-based tests administered on Sunday, August 15, 1999, from 6:45 a.m. to 5:00 p.m.

<sup>2</sup> American Dental Association, American Association of Dental Examiners, and American Association of Dental Schools, Joint Committee on Examiner Calibration, “Guidelines for Examiner Standardization” (Chicago: October 1998), p. 11.

<sup>3</sup> The Bureau uses the term “rating criteria” since all grades [*i.e.*, “0”, “1”, “2”, “3”, “4”, “5”] start out as ratings [*i.e.*, “ideal”, “satisfactory (slight errors)”, “minimally satisfactory (moderate errors)”, “minimally unsatisfactory (marked errors)”, “unsatisfactory (gross errors)”, and “highly unsatisfactory (critical errors)”].

<sup>4</sup> The impartial observer uses the term “grader” instead of “examiner”, but the terms are practically synonymous with one another. Examiners, however, can be either actual graders, or non-grading supervisors and informal grade reviewers.

<sup>5</sup> American Dental Association, American Association of Dental Examiners, and American Association of Dental Schools, Joint Committee on Examiner Calibration, “Guidelines for Examiner Standardization” (Chicago: October 1998), p. 11.

<sup>6</sup> Section 16-79-100(c), Hawaii Administrative Rules (Department of Commerce and Consumer Affairs; Dentists and Dental Hygienists).

<sup>7</sup> Interview with Dr. Wallace Chong, Jr., Chairperson of the Board of Dental Examiners, October 25, 1999.

<sup>8</sup> Frank J. Courts, “Impartial Observer Report: Hawaii Board of Dental Examiners, February 24-26, 1995, and August 11-13, 1995”, 7 pp.

<sup>9</sup> The Bureau refers to “graders” as “examiners”; the impartial observer refers to “examiners” as “graders”.

<sup>10</sup> Section 16-70-100(c), Hawaii Administrative Rules (Department of Commerce and Consumer Affairs; Dentists and Dental Hygienists), requires eligible graders to be standardized by a dentist who is appointed to the faculty of a college of dentistry and who has demonstrated knowledge and experience in dental examination testing, or by a grader or dental examiner from another state or a regional dental board (*i.e.*, the Western Regional Examining Board, the Central Regional Dental Testing Service, the North East Regional Board of Dental Examiners, or the Southern Regional Testing Agency).

<sup>11</sup> This recommendation was based on the possibility of damage to the wax pattern caused by an examiner before valid and reliable evaluation can occur. Letter from Dr. Frank J. Courts to Ms. Dawn Kubota, Licensing Examiner with the Department of Commerce and Consumer Affairs, Professional and Vocational Licensing Division, Examination Branch, October 21, 1996, 2 pp.

<sup>12</sup> Should probably read “preparation” rather than “restoration”.

<sup>13</sup> A. Lewis Leo, “Final Report of Court Appointed Master of Hawaii Dental Examination, Civil No. 76-0455, Robert L. Pekarsky and Arnie J. Koch, Individually, and on Behalf of All Other Similarly Situated, Plaintiffs, vs. George R. Ariyoshi, et. al., and His Capacity as Governor: State of Hawaii, et. al., Defendants” (October 26, 1990), pp. 12-13.

<sup>14</sup> To preserve the security of the dental licensing examination, the dimensions are not included in this report.

<sup>15</sup> *Hawaii Revised Statutes*, chapter 91.

<sup>16</sup> The principal duties of the informal grade reviewer are to assist a candidate in understanding how a particular grade may have been derived, and to make a recommendation to the Board concerning the regrading of the candidate’s examination if the grade is challenged. Section 16-79-110, Hawaii Administrative Rules (Department of Commerce and Consumer Affairs; Dentists and Dental Hygienists).

<sup>17</sup> Interview with Dr. Karen Hu, Informal Grade Reviewer, September 21, 1999. Dr. Hu is a dentist and qualified to conduct informal examination reviews.

<sup>18</sup> The 10 mm periodontal probe used by the examiners during the standardization session for the August 13-15, 1999, dental licensing examination was marked in increments of 1-1-1-2-2-1-1-1 mm.

<sup>19</sup> To preserve the security of the dental licensing examination, the type of explorer, the specific location on the tine of the explorer, and the manufacturer of the explorer are not included in this report.

<sup>20</sup> Many of the examiners helping to administer or grade the August 1999 dental licensing examination and restorative technique examination mentioned that the dental licensing examination is a test of a candidate's clinical judgment.

<sup>21</sup> For example, the Western Regional Examining Board uses rating criteria such as "Cavosurface angles may lead to enamel fracture or fracture of the restoration". Western Regional Examining Board, "1999 Dental Candidate Guide" (Phoenix: 1999), p. 19.

Many of the examiners helping to administer or grade the August 1999 dental licensing examination and restorative technique examination mentioned that dentistry involves the recognition of what may or many not compromise the integrity of a tooth or restoration.

<sup>22</sup> American Dental Association, American Association of Dental Examiners, and American Association of Dental Schools, Joint Committee on Examiner Calibration, "Guidelines for Examiner Standardization" (Chicago: October 1998), p. 4.

<sup>23</sup> The upper limit of acceptability (*e.g.*, approximately 1 mm for the Western Regional Examining Board) for proximal extensions is more relevant to this discussion than the lower limit (*e.g.*, approximately 0.5 mm for the Western Regional Examining Board) since it is one of eleven different criteria that determine whether a candidate will receive a passing grade or a failing grade (excepting those criteria that require a mandatory grade of "0").

<sup>24</sup> The Bureau refers to "graders" as "examiners"; the impartial observer refers to "examiners" as "graders".

<sup>25</sup> Interview with Dr. Robert Christoffersen, October 12, 1999.

Dr. Christoffersen was the calibrator for the August 1999 dental licensing examination. He has been Hawaii's calibrator for the past twenty-three years. Dr. Christoffersen is the Executive Associate Dean of the University of the Pacific School of Dentistry and the President of the California Board of Dental Examiners.

The Bureau asked Dr. Christoffersen to review its description of the events that took place during the examiner standardization and calibration session for accuracy.

The cut-off for critical difference grades specified in section 16-79-100(c), Hawaii Administrative Rules, is thirteen percent.

Although a dentist who exceeds thirteen percent in critical difference grades is not allowed to grade, the dentist may still perform other non-grading duties such as clinical floor coordinator and simulation floor coordinator. Section 16-79-93(a)(1) and (2), Hawaii Administrative Rules (Department of Commerce and Consumer Affairs; Dentists and Dental Hygienists).

<sup>26</sup> Interview with Dr. Robert Christoffersen, October 12, 1999.

<sup>27</sup> A. Lewis Leo, "Report of Court Appointed Master of Hawaii Dental Examination, February 24, 25, 26, 1989, Civil No. 76-0455, Robert L. Pekarsky and Arnie J. Koch, Individually, and on Behalf of All Other Similarly Situated, Plaintiffs, vs. George R. Ariyoshi, et. al., and His Capacity as Governor: State of Hawaii, et. al., Defendants" (May 1, 1989), p. 10.

<sup>28</sup> Interview with Dr. Robert Christoffersen, October 12, 1999.

<sup>29</sup> The non-grading supervisor of examiners (*or graders*), section 16-79-93(a)(3), Hawaii Administrative Rules (Department of Commerce and Consumer Affairs; Dentists and Dental Hygienists); three examiners to grade the dental licensing examination, section 16-79-100(c), Hawaii Administrative Rules; the informal grade reviewer, section 16-79-110(a), Hawaii Administrative Rules; and three examiners to regrade a candidate's examination if the candidate successfully challenges a grade, section 16-79-110(h), Hawaii Administrative Rules.

<sup>30</sup> Three grading examiners and the supervisor of examiners.

<sup>31</sup> Interview with Ms. Jodi Leandro, Licensing Examiner with the Department of Commerce and Consumer Affairs, Professional and Vocational Licensing Division, Examination Branch, October 25, 1999.

<sup>32</sup> The informal grade reviewer and three examiners to regrade a candidate's examination if the candidate successfully challenges a grade.

<sup>33</sup> American Dental Association, American Association of Dental Examiners, and American Association of Dental Schools, Joint Committee on Examiner Calibration, "Guidelines for Examiner Standardization" (Chicago: October 1998), p. 11.

<sup>34</sup> Section 16-79-100(c), Hawaii Administrative Rules (Department of Commerce and Consumer Affairs; Dentists and Dental Hygienists).

<sup>35</sup> The exact nature of the rating criterion is unimportant and beyond the scope of this study.

<sup>36</sup> Dr. Wallace Chong, Jr., [wchong5769@aol.com](mailto:wchong5769@aol.com), "RE: Standardization remarks", November 18, 1999. Personal e-mail to writer (November 18, 1999).

<sup>37</sup> American Dental Association, American Association of Dental Examiners, and American Association of Dental Schools, Joint Committee on Examiner Calibration, "Guidelines for Examiner Standardization" (Chicago: October 1998), p. 9.

<sup>38</sup> According to the calibrator, the potential examiners were not so adversely influenced even when the impartial observer (*i.e.*, Dr. Courts) and a former state legislator observed the standardization and calibration session. Interview with Dr. Robert Christoffersen, October 12, 1999.

<sup>39</sup> Frank J. Courts, "Impartial Observer Report: Hawaii Board of Dental Examiners, February 24-26, 1995, and August 11-13, 1995", p. 6.

Letter from Dr. Frank J. Courts to Ms. Dawn Kubota, Licensing Examiner with the Department of Commerce and Consumer Affairs, Professional and Vocational Licensing Division, Examination Branch, October 21, 1996, p. 2.

See subsequent comments by Dr. Christoffersen concerning this point. Interview with Dr. Robert Christoffersen, October 12, 1999.

<sup>40</sup> Frank J. Courts, "Impartial Observer Report: Hawaii Board of Dental Examiners, February 24-26, 1995, and August 11-13, 1995", p. 6.

Letter from Dr. Frank J. Courts to Ms. Dawn Kubota, Licensing Examiner with the Department of Commerce and Consumer Affairs, Professional and Vocational Licensing Division, Examination Branch, October 21, 1996, p. 2.

The thirteen percent cutoff appeared to be based on the use of a small group of repetitive examiners. According to Dr. Leo:

As a starting point critical differences of 13.82% [mean plus two standard deviations][*sic*] would be acceptable. However, with a small group of repetitive graders such as used by the Hawaii Board it would appear more reasonable that critical differences of 13% should be the top end of an acceptable performance. This goal should be attainable by the August 1989 examination. [emphasis added]

A. Lewis Leo, "Report of Court Appointed Master of Hawaii Dental Examination, February 24, 25, 26, 1989, Civil No. 76-0455, Robert L. Pekarsky and Arnie J. Koch, Individually, and on Behalf of All Other Similarly Situated,

Plaintiffs, vs. George R. Ariyoshi, et. al., and His Capacity as Governor: State of Hawaii, et. al., Defendants” (September 29, 1988), p. 12.

<sup>41</sup> Letter from Ms. Dawn Kubota, Licensing Examiner with the Department of Commerce and Consumer Affairs, Professional and Vocational Licensing Division, Examination Branch, to Dr. Frank J. Courts, July 12, 1996, p. 2.

Hawaii, Board of Dental Examiners, “Minutes of Meeting; Monday, June 10, 1996”, p. 7.

<sup>42</sup> Interview with Dr. Robert Christoffersen, October 12, 1999.

<sup>43</sup> Section 16-79-100(b), Hawaii Administrative Rules (Department of Commerce and Consumer Affairs; Dentists and Dental Hygienists), requires the chairperson of the Board to determine the number of examiners that will be needed to grade the dental licensing examination and the restorative technique examination.

<sup>44</sup> Hawaii, Department of Commerce and Consumer Affairs, Professional and Vocational Licensing Division, Examination Branch, “Report on the August 7, 8, 9, 14, 15, and 16, 1998, Dental Examinations”, 36 pp.

<sup>45</sup> Interview with Ms. Jodi Leandro, Licensing Examiner with the Department of Commerce and Consumer Affairs, Professional and Vocational Licensing Division, Examination Branch, October 27, 1999.

<sup>46</sup> Dr. Wallace Chong, Jr., [wchong5769@aol.com](mailto:wchong5769@aol.com), “RE: Standardization remarks”, November 18, 1999. Personal e-mail to writer (November 18, 1999).

<sup>47</sup> Interview with Mr. James Kobashigawa, Executive Officer, Board of Dental Examiners, Department of Commerce and Consumer Affairs, Professional and Vocational Licensing Division, November 17, 1999.

<sup>48</sup> Letter from Dr. Joseph Rossa, Chairman, North East Regional Board of Dental Examiners, October 27, 1999, 4 pp.

<sup>49</sup> Hawaii, Board of Dental Examiners, Meeting; Monday, November 16, 1999.

<sup>50</sup> American Dental Association, American Association of Dental Examiners, and American Association of Dental Schools, Joint Committee on Examiner Calibration, “Guidelines for Examiner Standardization” (Chicago: October 1998), p. 9.

<sup>51</sup> *Hawaii Revised Statutes*, chapter 92.

<sup>52</sup> Twelve out of the twenty-one candidates taking the dental licensing examination, or portions thereof, received a failing score; nine out of the twenty-one candidates received a passing score. Hawaii, Department of Commerce and Consumer Affairs, Professional and Vocational Licensing Division, Examination Branch, “Report on the August 13-15, 1999, Dental Examinations”, 34 pp.

<sup>53</sup> Interview with Ms. Dawn Kubota and Ms. Jodi Leandro, Department of Commerce and Consumer Affairs, Professional and Vocational Licensing Division, Examination Branch, September 9, 1999.

<sup>54</sup> United States and foreign dental school graduates perform the preparation part of the class II amalgam test on a mannequin. United States dental school graduates do not perform the restoration part of the class II amalgam test on a mannequin. United States dental school graduates also perform the preparation and restoration parts of the class II amalgam test on a patient.

<sup>55</sup> American Dental Association, ADA News Daily, “AADE actions detailed”, <http://www.ada.org/adapco/daily/9703/0313aade.html> (May 15, 1998). *Note: this article is no longer available online from the ADA.*

<sup>56</sup> Invitational Conference for Dental Clinical Testing Agencies, “An Agenda for Change in the Clinical Licensure Examination”, <http://www.ada.org/prac/careers/agenda.html> (May 11, 1999).

<sup>57</sup> American Dental Association and American Association of Dental Examiners, Licensure Committee, “Guidelines for Valid and Reliable Dental Licensure Clinical Examinations” (Chicago: May 1992), p. 9.

<sup>58</sup> For example, section 16-79-95, Hawaii Administrative Rules, regarding anonymity of the licensure examination, and section 16-79-96, Hawaii Administrative Rules, regarding anonymous testing procedures, which apply to the “licensure examination”. Whether the term “licensure examination” applies to the dental licensing examination or the restorative technique examination, or both, is unclear.

<sup>59</sup> Hawaii, Board of Dental Examiners, “Minutes of Meeting; Monday, June 10, 1996”, pp. 4-5.

<sup>60</sup> Hawaii, Board of Dental Examiners, “Minutes of Meeting; Monday, June 29, 1998”, p. 5.

<sup>61</sup> Hawaii, Board of Dental Examiners, “Minutes of Meeting; Thursday, May 6, 1999”, p. 6-7.

<sup>62</sup> Section 16-79-105(a), Hawaii Administrative Rules, requires the grading of the practical sections of the dental licensing examination to be based solely on the written criteria provided in Appendix A, entitled Grading Criteria for the Practical Sections of the Hawaii Dental Licensure Examination, dated August 1990.

Section 16-79-105(d), Hawaii Administrative Rules, makes the written criteria the sole and exclusive standard by which to measure and grade the dental skills of an applicant. This latter point is further reinforced by section 16-79-99(b), Hawaii Administrative Rules, which requires each grading examiner to comply with the “established comprehensive written criteria that shall be the sole and exclusive standard by which to measure and grade the dental skills of a candidate”.

<sup>63</sup> A copy of chapter 16-79, Hawaii Administrative Rules (Department of Commerce and Consumer Affairs; Dentists and Dental Hygienists), was obtained from the Office of the Lieutenant Governor on October 22, 1999, to verify this point.

<sup>64</sup> Section 16-79-111(c), Hawaii Administrative Rules, also allows the Board to provide any remedy it deems appropriate to negate the negative effects of a substantial disadvantage to a candidate including (1) regrading a section of the examination, (2) allowing a candidate to retake any section of the examination prior to the next scheduled dental licensing examination, or (3) substituting the grades obtained by a candidate for the class II amalgam preparation on the mannequin for the grades obtained by the candidate on the class II amalgam preparation or the class III/IV acid-etch composite preparation on the patient.

The rules presumably allow even the substitution of grades obtained by a candidate for the class II amalgam preparation on the mannequin for the grades obtained by the candidate for the crown and bridge procedure on the mannequin. Hawaii, Department of Commerce and Consumer Affairs, Board of Dental Examiners, “Minutes of Meeting; Monday, May 18, 1992”, p. 6.

<sup>65</sup> Correlation coefficients range from  $-1.00$  to  $+1.00$ . A correlation coefficient of  $+1.00$  would indicate perfect agreement between grades, for example: “0” and “0”, “1” and “1”, “2” and “2”, “3” and “3”, “4” and “4”, and “5” and “5”. Conversely, a correlation coefficient of  $-1.00$  would indicate perfect disagreement between grades, for example: “0” and “5”, “1” and “4”, “2” and “3”, “3” and “2”, “4” and “1”, and “5” and “0”. A correlation coefficient of 0 would indicate no agreement between grades.

<sup>66</sup> As a general rule, correlation coefficients from 0 to 0.25 indicate little or no relationship, those from 0.25 to 0.50 indicate a fair degree of relationship, those from 0.50 to 0.75 a moderate to good relationship, and those above 0.75 a very good to excellent relationship. Correlation coefficients of 0.95 or higher are viewed with immediate suspicion, particularly in the biological field and where human data are involved. Theodore Colton, *Statistics in Medicine* (Boston: Little, Brown and Company, 1974), p. 211.

<sup>67</sup> A blank could have indicated that a candidate's patient failed to show up or walked out of the dental licensing examination, or that the candidate's patient was rejected by the examiners.

Mechanical pulp exposures were excluded because a candidate is penalized the same way for (a) not reporting an anticipated mechanical pulp exposure before the fact, and (b) reporting an unanticipated mechanical pulp exposure after the fact. In fairness to the Board, it does not seem possible to distinguish between anticipated and unanticipated mechanical pulp exposures after they have occurred. In fairness to a candidate, especially a dentist who has been practicing independently for a number of years, reporting an anticipated mechanical pulp exposure seems to be more representative of dentistry as it is practiced in dental schools. Hawaii, Department of Commerce and Consumer Affairs, "Instructions and Information for the Hawaii Dental Licensure Examination (August 1999), p. 15.

<sup>68</sup>

<b>Class II Amalgam Preparation</b>	<b>Patient</b>	<b>Mannequin</b>	
Mean	2.554	2.719	
Median	2.000	3.000	
Mode	2.000	2.000	
Maximum	4.333	4.666	
Minimum	0.666	0.000	
Total count	229	229	
Unduplicated count	163	163	
Population correlation (rho)			0.22718

<b>Conditions for X and Y</b>	<b>Frequency</b>
X is greater than or equal to 3.000 and Y is greater than or equal to 3.000	68
X is greater than or equal to 3.000 and Y is less than or equal to 2.000	43
X is less than or equal to 2.000 and Y is greater than or equal to 3.000	60
X is less than or equal to 2.000 and Y is less than or equal to 2.000	58
Total number of pairs	229

<sup>69</sup> Hawaii, Board of Dental Examiners, "Minutes of Meeting; Monday, June 29, 1998", p. 5.

<sup>70</sup> Hawaii, Board of Dental Examiners, "Minutes of Meeting; Monday, June 10, 1996", p. 5.

<sup>71</sup> Although these three positions are not involved with the grading process, the supervisor of examiners is required to pass the calibration exam administered to examiners who are involved with grading. Section 16-79-93(a), Hawaii Administrative Rules (Department of Commerce and Consumer Affairs; Dentists and Dental Hygienists).

## Chapter 5

### PASS RATES AND RATIOS

#### Scope and Organization of this Chapter

Section 6(1)(A) to (D) of part III of Act 254, Session Laws of Hawaii 1999, requests the Bureau to compare the dental licensing examination pass rates of the following groups of applicants when considering whether the examination appropriately tests for professional competency in dentistry or serves as an undue exclusionary barrier to entry into the profession:

- (1) Graduates of accredited dental schools located in the United States;
- (2) Graduates of unaccredited dental schools located in the United States;
- (3) Graduates of accredited dental schools located in foreign countries; and
- (4) Graduates of unaccredited dental schools located in foreign countries.

For the purposes of this chapter, the Bureau analyzed the period between February 1995 and February 1999.

#### Accreditation in the United States and Abroad

**Background.** The Commission on Dental Accreditation of the American Dental Association is recognized by the United States Department of Education to accredit dental schools.<sup>1</sup> By reciprocal agreement, dental schools accredited by the Commission on Dental Accreditation of Canada are recognized by the Commission on Dental Accreditation of the American Dental Association.<sup>2</sup> In addition, the Commission on Dental Accreditation of the American Dental Association does not accredit foreign dental schools. All United States dental schools with education programs leading to the D.D.S. or D.M.D. degree are accredited at this time and none has ever had its accreditation status withdrawn.<sup>3</sup> In addition, all graduates of United States dental schools with education programs leading to the D.D.S. or D.M.D. degree, including graduates of programs deemed “accreditation eligible” (*e.g.*, Nova Southeastern University College of Dentistry in Gainesville, Florida), qualify for National Dental Board and licensure examination.

**Evaluating credentials.** As previously mentioned in Chapter 1, the educational credentials of a candidate who attends a dental school not accredited by the Commission on Dental Accreditation of the American Dental Association or the Commission on Dental Accreditation of Canada are evaluated for the Joint Commission on National Dental Examinations by Educational Credential Evaluators, Inc. of Milwaukee, Wisconsin. According to Ms. Margit Schatzman, Vice President of Educational Credential Evaluators, Inc.,<sup>4</sup> most other countries do not use the concept of “accreditation” in their educational systems. If these

countries do use the term accreditation, it often does not reflect the same concept as regional accreditation in the United States.

When Educational Credential Evaluators, Inc., evaluates foreign educational programs, it determines whether or not an institution offering a program is the equivalent of a regionally-accredited institution in the United States. To find out whether a foreign institution has that equivalent status, Educational Credential Evaluators, Inc., determines whether that institution is a recognized, postsecondary degree-granting institution. When Educational Credential Evaluators, Inc., analyzes foreign educational systems, it looks for that type of recognition when determining if a foreign institution has the equivalent of regional academic accreditation in the United States. Educational Credential Evaluators, Inc., has been evaluating the educational credentials of foreign dental school graduates for the Joint Commission on National Dental Examinations since May 1997.<sup>5</sup> Prior to that time, the American Dental Association itself evaluated the educational credentials of foreign dental school graduates.<sup>6</sup>

**Assumptions.** Since foreign dental school graduates must pass parts I and II of the National Board Dental Examinations prior to taking the restorative technique examination, the Bureau assumed—for the sake of expediency—that these foreign dental schools were fully and continuously accredited by the governments of their countries from February 1990 to February 1999. Consequently, the Bureau’s analysis is essentially a comparison between United States and foreign dental school graduates. It should be noted, however, that comparing the dental licensing examination pass rates of these two groups can be misleading since only the latter group must pass the restorative technique examination before taking the dental licensing examination.

## Methodology

**Naming convention.** For the purposes of this chapter, the term:

“United States dental school graduates” includes Canadian dental school graduates.

“Foreign dental school graduates” refers to graduates of dental schools from countries other than the United States or Canada.

**Cohort identification.** Because it was (and still is) impossible for foreign dental school graduates to take the restorative technique examination and the dental licensing examination at the same time (*e.g.*, in February 1999), it was necessary to identify the cohort of foreign dental school graduates who took a restorative technique examination in time to qualify for a dental licensing examination that was administered between February 1995 and February 1999. Only after identifying this cohort and determining their record of success or failure on the restorative technique examination could the pass rates of United States and foreign dental school graduates on the dental licensing examination be meaningfully compared. This cohort of foreign dental school graduates was selected by following a six-step process.<sup>7</sup>

**Limitations.** The reader is urged to keep in mind that a difference between the pass rate of United States and foreign dental school graduates on the dental licensing examination does not automatically imply that the examination serves as an undue exclusionary barrier to entry into the profession. According to the American Dental Association, only about forty-five percent of foreign dental school graduates pass part I of the two-part, multiple-choice, National Board Dental Examinations on their first attempt; and their first-try pass rate for part II is only slightly higher.<sup>8</sup> In contrast, eighty-five percent of United States dental school graduates pass each part of the National Board Dental Examinations on their first attempt. In addition, the American Dental Association reported that failure rates for foreign dental school graduates on clinical examinations ranged from sixty-five to seventy-five percent in the most recent five years for which data are available.

This study is not an analysis of dental school graduates taking the dental licensing examination or the restorative technique examination for the first time. In addition, pass rates on the two examinations are expressed in terms of percentages and the number of successful attempts per twenty-five unsuccessful attempts. The latter figures, which are actually ratios, were computed because of the disparity between the number of foreign and United States dental school graduates taking the dental licensing examination. Percentages can be misleading when they are based on substantially less than one hundred cases and when the groups being compared differ substantially in size.

The results of the Bureau's analysis are described in Table 10 on page 56.

## Results

United States dental school graduates pass the dental licensing examination at a higher rate than foreign dental school graduates—53.66 percent versus 41.30 percent. Viewed another way, for every twenty-five unsuccessful attempts by United States dental school graduates to pass the dental licensing examination, twenty-nine were successful. By comparison, for every twenty-five unsuccessful attempts by foreign dental school graduates to pass the dental licensing examination, only eighteen were successful.

As previously mentioned, comparing the dental licensing examination pass rates of United States and foreign dental school graduates can be misleading since only the latter group must pass the restorative technique examination before taking the dental licensing examination. The pass rate on the restorative technique examination for the abovementioned cohort of foreign dental school graduates was 26.73 percent. Viewed another way, for every twenty-five unsuccessful attempts by foreign dental school graduates to pass the restorative technique examination, nine were successful.

If the pass rate of foreign dental school graduates on the dental licensing examination is made a function of their pass rate on the restorative technique examination, then the pass rate for this cohort of foreign dental school graduates on the dental licensing examination was 18.81<sup>9</sup> percent instead of 41.30 percent. Viewed another way, for every twenty-five unsuccessful

attempts by foreign dental school graduates to pass the restorative technique examination, there were 6 successful attempts to pass the dental licensing examination.<sup>10</sup>

**Table 10: Pass Rates for Graduates of Accredited (United States) and Non-Accredited (Foreign) Dental Schools**

Year	Exam	DLE <sup>a</sup> (Acc) <sup>b</sup> (Pass) <sup>c</sup>	DLE (Acc)(Take) <sup>d</sup>	Pass	DLE (Non) <sup>e</sup> (Pass)	DLE (Non)(Take)	Pass	RTE <sup>f</sup> (Pass)	RTE (Take)	Pass
1994	August	*	*		*	*		3	11	
1995	February	11	18		0	3		4	9	
1995	August	16	28		4	8		3	13	
1996	February	7	19		2	5		1	9	
1996	July	15	32		2	6		2	12	
1997	February	8	21		1	3		2	9	
1997	July	19	32		2	4		5	11	
1998	February	9	15		1	5		1	12	
1998	August	15	27		2	6		4	4	
1999	February	10	13		5	6		N/A	N/A	
	Actual	110	205	53.66%	19	46	41.30%	25	90	27.78%
	Included datum <sup>g</sup>							2	11	
	Adjusted <sup>h</sup>							27	101	26.73%
		DLE (Acc)(Pass)	DLE (Acc)(Fail)		DLE (Non)(Pass)	DLE (Non)(Fail)		RTE (Pass)	RTE (Fail)	
	Actual	110	95		19	27		25	65	
	Adjusted							27	74	
		DLE (Acc)(Pass)	DLE (Acc)(Fail)		DLE (Non)(Pass)	DLE (Non)(Fail)		RTE (Pass)	RTE (Fail)	
	Actual— Standardized to 25 failures	28.95	25		17.59	25		9.62	25	
	Adjusted— Standardized to 25 failures							9.12	25	

<sup>a</sup>Dental licensing examination

<sup>b</sup>Accredited dental schools (United States and Canadian)

<sup>c</sup>Passing (in number of candidates)

<sup>d</sup>Taking (in number of candidates)

<sup>e</sup>Nonaccredited dental schools (foreign)

<sup>f</sup>Restorative technique examination

<sup>g</sup>See paragraph (6)(A) and (B) in endnote 7 for a description of the included datum

<sup>h</sup>Adjusted for the included datum

Source: Hawaii, Department of Commerce and Consumer Affairs, Professional and Vocational Licensing Division, Examination Branch, "Passing Rates and Examination Statistics for Dentistry: February 1992 to February 1999" (corrected copy), 2 pp.

**Discussion.** The fact that United States dental school graduates pass the dental licensing examination at a higher rate than foreign dental school graduates—53.66 percent versus 41.30 percent—is not remarkable, and is consistent with reports from the American Dental Association.

The low pass rate on the restorative technique examination, however, deserves closer scrutiny. As previously mentioned in Chapter 2, foreign dental school graduates taking the restorative technique examination must pass the 30-item “differentiation” test on prosthodontics, the class II amalgam restoration test, and the class III/IV composite restoration test with a score of 3.000 or more on each test. Unlike the dental licensing examination, which uses a compensatory scoring model, the restorative technique examination uses a conjunctive scoring model. A conjunctive model is more demanding of candidates than a compensatory model, and the pass rate for a conjunctive model is lower than a comparable compensatory model.

The analysis that follows is not intended to question the need for the restorative technique examination, which is administered to protect the health, safety, and welfare of patients who volunteer to take part in the dental licensing examination. Instead, it is intended to illustrate the demands placed on foreign dental school graduates by a conjunctive scoring model, and the allowances given to United States dental school graduates by a compensatory scoring model. It would be inappropriate to use these data to eliminate the restorative technique examination since foreign dental school graduates take the restorative technique examination on ceramic teeth mounted in a mannequin and United States dental school graduates take the comparable performance-based tests on live patients. The Bureau does not know of any methodology for comparing ratings, grades, and scores obtained on mannequins to ratings, grades, and scores obtained on live patients, and vice-versa. Without this methodology, the variability in knowledge and skills of United States and foreign dental school graduates cannot be properly assessed and given appropriate consideration. For example, United States dental school graduates may exhibit less variability in knowledge and skills than foreign dental school graduates even though the latter may exhibit a similar level of knowledge and skills.

Similarly, the Bureau does not know of any methodology for assessing and considering the effects of fatigue on United States and foreign dental school graduates, which is likely to be more pronounced on the dental licensing examination than on the restorative technique examination. As illustrated below in Table 11, foreign dental school graduates taking the restorative technique examination must perform two procedures in four and one-half hours on the same day, while United States dental school graduates must perform three procedures in six and one-half hours on the same day. Foreign dental school graduates who pass the restorative technique examination must subsequently pass the dental licensing examination taken by United States dental school graduates.

**Table 11: Procedures Performed on One Day;  
Dental Licensing Examination versus Restorative Technique Examination<sup>11</sup>**

	<b>Dental Licensing Examination</b>	<b>Restorative Technique Examination</b>
Class II Amalgam Restoration <sup>a</sup>	2 ½ hours (recommended time)	2 ½ hours (recommended time)
Class III/IV Composite Restoration <sup>a</sup>	2 hours (recommended time)	2 hours (recommended time)
Endodontic Preparation <sup>a</sup>	2 hours (recommended time)	Not applicable
<b>TOTAL TIME ALLOWED:</b>	<b>6 ½ hours (absolute time limit)</b>	<b>4 ½ hours (absolute time limit)</b>
<sup>a</sup> The procedures can be performed in any order		

To conduct this analysis, the Bureau analyzed the scores of United States dental school graduates to see how many of them passed the differentiation test, the class II amalgam restoration test, and the class III/IV composite restoration test with a score of 3.000 or more on each test. The criteria for inclusion were:

- (1) A United States dental school graduate had to have at least two grades for the preparation and restoration parts of the class II amalgam test and the class III/IV composite test. A zero (“0”) was considered a grade; a blank or mechanical pulp exposure was not considered a grade;<sup>12</sup> and
- (2) The scores on the differentiation test, the class II amalgam test, and the class III/IV composite test had to be from the same examination (*e.g.*, February 1999); scores from a partial retake of the dental licensing examination were included as long as they were all from the same examination.

One hundred eighty United States dental school graduates met the criteria for inclusion in this analysis; forty-six—or 25.56 percent—passed the differentiation test, the class II amalgam restoration test, and the class III/IV composite restoration test with a score of 3.000 or more on each test. Viewed another way, for every twenty-five unsuccessful attempts by United States dental school graduates to pass the differentiation test, the class II amalgam test, and the class III/IV composite test, nine were successful. In comparison, the pass rate on the restorative technique examination for the abovementioned cohort of foreign dental school graduates was 26.73 percent. Viewed another way, for every twenty-five unsuccessful attempts by foreign dental school graduates to pass the differentiation test, the class II amalgam restoration test, and the class III/IV composite restoration test, nine were successful.

As previously mentioned, this analysis is intended only to illustrate the demands placed on foreign dental school graduates by a conjunctive scoring model, and the allowances given to United States dental school graduates by a compensatory scoring model. It would be inappropriate to use these data to eliminate the restorative technique examination.

## Summary

United States dental school graduates pass the dental licensing examination at a higher rate than foreign dental school graduates—53.66 percent versus 41.30 percent. The pass rate on the restorative technique examination for this cohort of foreign dental school graduates was 26.73 percent. If the pass rate of foreign dental school graduates on the dental licensing examination is made a function of their pass rate on the restorative technique examination, then the pass rate for foreign dental school graduates on the dental licensing examination was 18.81 percent instead of 41.30 percent.

If the dental licensing examination was scored using a conjunctive model rather than a compensatory model, then the pass rate for United States dental school graduates would be less than or equal to 25.56 percent instead of 53.66 percent. A conjunctive scoring model places substantial demands on foreign dental school graduates taking the restorative technique

examination. Conversely, a compensatory scoring model gives substantial allowances to United States dental school graduates and foreign dental school graduates taking the dental licensing examination. It would be inappropriate to use these data to eliminate the restorative technique examination taken by foreign dental school graduates.

## Endnotes

<sup>1</sup> American Dental Association, “Dental Schools in the U.S. and Canada: Accredited Program Listing”, <http://www.ada.org/prac/careers/apl-01.html> (October 13, 1999).

U.S., Department of Education, “National Institutional and Specialized Accrediting Bodies”, <http://www.ed.gov/offices/OPE/students/file4b.html> (October 13, 1999).

<sup>2</sup> American Dental Association, “National Board Dental Examination Program, August 1999”, <http://www.ada.org/prac/careers/natbd.html> (October 13, 1999).

<sup>3</sup> Interview with Dr. Frank Lecari, American Dental Association, July 28, 1999.

<sup>4</sup> Margit Schatzman, [margit@ece.org](mailto:margit@ece.org), “RE: Accreditation of Foreign Dental Schools”, August 9, 1999. Personal e-mail (August 9, 1999).

<sup>5</sup> Interview with Ms. Laura Martinez, Educational Credential Evaluators, October 14, 1999.

<sup>6</sup> Interview with Ms. Judy Friend, American Dental Association, October 14, 1999.

<sup>7</sup> The selection process:

- (1) Begin with the basic assumption that foreign dental school graduates who took the dental licensing examination between February 1990 and February 1999 also took the restorative technique examination between February 1990 and February 1999;
- (2) Exclude dental licensing examination data on United States and foreign dental school graduates before February 1995 because of changes in the examination’s content that took effect with the administration of the February 1995 examination;
- (3) Exclude data on the February 1999 restorative technique examination because foreign dental school graduates who passed the February 1999 restorative technique examination could not take the dental licensing examination until August 1999;
- (4) Include data on the August 1994 restorative technique examination because foreign dental school graduates who passed the August 1994 restorative technique examination could not take the dental licensing examination until February 1995;
- (5) Exclude restorative technique examination data on foreign dental school graduates who passed the dental licensing examination before February 1995 since these graduates would not have a reason to take the restorative technique examination again;
- (6) Exclude restorative technique examination data on foreign dental school graduates who took the restorative technique examination before August 1994, except as otherwise indicated below:

- (A) Include restorative technique examination data between February 1990 and February 1994 if a foreign dental school graduate passed the restorative technique examination before August 1994 and took the dental licensing examination after August 1994.

These data were included since it was possible for a candidate to qualify for the February 1995 dental licensing examination by passing any restorative technique examination administered between February 1990 and February 1994.

See the following example:

Failed August 1993 restorative technique examination	(Include datum)
Passed February 1994 restorative technique examination	(Include datum)
Failed August 1994 dental licensing examination	(Not applicable)
Failed February 1995 dental licensing examination	(Not applicable)
Passed August 1995 dental licensing examination	(Not applicable)

- (B) Include restorative technique examination data between February 1990 and February 1994 if a foreign dental school graduate passed the restorative technique examination between August 1994 and August 1998 and took the dental licensing examination after August 1994.

These data were included since it was possible for a candidate to qualify for the February 1995 dental licensing examination even though the candidate failed the February 1990, August 1990, February 1991, August 1991, February 1992, August 1992, February 1993, August 1993, or February 1994 restorative technique examinations.

See the following example:

Failed February 1992 restorative technique examination	(Include datum)
Passed August 1995 restorative technique examination	(Include datum)
Failed July 1996 dental licensing examination	(Not applicable)
Failed July 1997 dental licensing examinations	(Not applicable)

<sup>8</sup> American Dental Association, “Dental Licensure Information for Dentists from Other Countries, June 10, 1998”, <http://www.ada.org/prac/careers/non-us.html> (May 10, 1999).

<sup>9</sup> Computed as:

$$\begin{aligned} & [\text{DLE(Non)(Pass)} \div \text{RTE(Take)}] \times 100 = \\ & [19 \text{ successful attempts to pass the DLE} \div 101 \text{ attempts to pass the RTE}] \times 100 = \\ & 0.1881 \times 100 = \\ & 18.81 \text{ percent} \end{aligned}$$

<sup>10</sup> Computed as the ratio of:

$$\begin{aligned} & [\text{DLE(Non)(Pass)}] \text{ per } [\text{RTE(Fail)}] = \\ & 19 \text{ successful attempts to pass the DLE per } 74 \text{ unsuccessful attempts to pass the RTE} = \\ & 6.42 \text{ successful attempts to pass the DLE per } 25 \text{ unsuccessful attempts to pass the RTE} \end{aligned}$$

<sup>11</sup> Hawaii, Department of Commerce and Consumer Affairs, “Instructions and Information for the Hawaii Dental Licensure Examination (August 1999), pp. 1-2.

Hawaii, Department of Commerce and Consumer Affairs, "Instructions and Information for the Non-Accredited School Examination (August 1999), pp. 1-2.

<sup>12</sup> A blank could have indicated that a candidate's patient failed to show up or walked out of the dental licensing examination, or that the candidate's patient was rejected by the examiners.

Mechanical pulp exposures were excluded because a candidate is not allowed to take the restoration part of the class II amalgam test or the class III/IV composite test if an unanticipated exposure or anticipated but unreported exposure occurs during the preparation part of either test. Hawaii, Department of Commerce and Consumer Affairs, "Instructions and Information for the Hawaii Dental Licensure Examination (August 1999), p. 15.

## Chapter 6

### REGIONAL EXAMINATIONS

#### Scope and Organization of this Chapter

Section 6(2) of part III of Act 254, Session Laws of Hawaii 1999, requests the Bureau to determine whether any of the four regional dental examinations should be used in lieu of, or as an alternate to, the state-constructed dental licensing examination. The purpose of this study is not to determine whether Hawaii should become a member of any regional testing agency.

This chapter examines some of the claims and issues relating to the use of any of the four regional dental examinations in lieu of, or as an alternate to, the state-constructed dental licensing examination. Part I of this chapter is based on the Bureau's review of the written testimony on Senate Bill No. 2589 (Nineteenth Legislature, 1998, State of Hawaii), which proposed to replace the state-constructed dental licensing examination with "any United States regional board examination". This part is not intended, and should not be construed, as a criticism of any person who testified on Senate Bill No. 2589. The regulation of dentistry is constantly changing and it is possible that the information contained in this chapter will be out of date by the time the Bureau's report is published. In addition, the different reporting protocols and procedures utilized by such organizations as the American Dental Association and the American Student Dental Association can produce different—but equally correct—results. Finally, all publications, including those cited by the Bureau in this chapter, contain inconsistencies.<sup>1</sup>

To simplify matters the Bureau worked mostly with the Western Regional Examining Board, which is in the time zone nearest to Hawaii. The Bureau's frequent references to the Western Regional Examining Board **should not** be construed as an endorsement of the examination administered by the Western Regional Examining Board (WREB) or as a disapproval of the examinations administered by the Central Regional Dental Testing Service (CRDTS), the North East Regional Board of Dental Examiners (NERB), and the Southern Regional Testing Agency (SRTA). If the Legislature can authorize the Board of Dental Examiners to accept the results of one regional testing agency's examination, then the Legislature can authorize the Board to accept the results of all four regional testing agencies' examinations. Because these examinations are highly technical in nature, only persons knowledgeable in dentistry and testing can appropriately compare and contrast them to the state-constructed dental licensing examination. This latter activity is the province of dentists and psychometricians, not the Bureau.

Part II of this chapter is based on a survey of the four regional testing agencies and interviews with their representatives. This part examines some of the public policy issues, *e.g.*, membership fees, reporting fees, and the testing of foreign dental school graduates, that the Legislature may want to consider before making a decision about the use of regional examinations.

The goal of parts I and II of this chapter is to ensure that any decision about the use of regional examinations is based on fact rather than speculation.

### Part I: Claim Check

- (1) **Claim:** Individual state and regional examination results (*i.e.*, pass/fail rates) cannot be compared with one another because of variations in test content, grading criteria, and scoring systems.

Finding: The data seem to suggest that this is a factual statement, for example:

- (1) Consider how a conjunctive scoring system would impact the results of the Hawaii dental licensing examination (see Chapters 2 and 5);
- (2) Consider how Hawaii and the WREB differ on the acceptable range for proximal extensions (see Chapter 4); and
- (3) Consider how the lowest grade becomes the final grade for an amalgam preparation in Hawaii but not the WREB (see Chapter 3).<sup>2</sup>

According to the *Guidelines for Examiner Standardization* (1998):<sup>3</sup>

The subject of scoring systems raises a good deal of concern and debate within the testing community. Because the scoring system used can have a considerable impact on the examination results, testing agencies are advised to seek the advice and input of consultants with expertise in tests and measurements regarding the design of their scoring systems. [emphasis added]

The Examiner Calibration Committee recommends that scoring system design be addressed as a subject for additional investigation and discussion by the communities of interest.

According to the American Association of Dental Examiners,<sup>4</sup> “clinical exams are quite variable not so much due to the procedures required for the various jurisdictions but more so due to the methodology”.

- (2) **Claim:** The Hawaii dental licensing examination process encompasses all twelve of the criteria recommended by the American Association of Dental Examiners and the American Dental Association as constituting an ideal examination. Other individual state and regional examinations fail to match up to all the standards of the Hawaii examination.

Finding: The Hawaii dental licensing examination seems to encompass at least ten of the twelve minimum common core requirements identified in the *Guidelines for Valid and*

*Reliable Dental Licensure Clinical Examinations* (May 1992)<sup>5</sup>. As mentioned in Chapter 4, the Board is actively exploring the nonpatient examination of periodontal diagnosis and treatment planning developed by the North East Regional Board of Dental Examiners and administered by Sylvan Technology Centers.<sup>6</sup> Although the *1998 Survey of Clinical Testing Agencies*<sup>7</sup> indicates that the Hawaii dental licensing examination does not test a candidate on “oral examination” and “dental history”, the Bureau believes that oral examination and dental history are being tested (although indirectly) when the candidate screens patients for the class II amalgam test and the class III/IV composite test. The Bureau believes that the examiners’ acceptance or rejection of a candidate’s patient for the class II amalgam test or the class III/IV composite test, although not a graded step, could be considered a form of “testing”.<sup>8</sup>

The examination administered by the State of Florida seems to encompass all twelve of the minimum common core requirements identified in the *Guidelines for Valid and Reliable Dental Licensure Clinical Examinations* (May 1992).<sup>9</sup> The examination administered by the NERB seems to encompass eleven of the twelve minimum common core requirements identified in the *Guidelines*.<sup>10</sup>

- (3) **Claim:** The Hawaii dental licensing examination has been evaluated as valid, reliable, and representative of the practice of dentistry today (*i.e.*, 1995) by an impartial observer hired as a consultant.

Finding: This is a factual statement. See Chapter 4 regarding the 1995 report of the impartial observer, Frank J. Courts, D.D.S., and Ph.D., of the University of Florida College of Dentistry. Dr. Courts assisted the late A. Lewis Leo, D.M.D., Associate Dean of the University of Florida College of Dentistry and the court’s master appointed as a result of the *Pekarsky* litigation (see Chapter 1), with the preparation of the master’s reports to the United States District Court for the District of Hawaii.

- (4) **Claim:** No other state accepts all four regional testing agency examinations as qualification for licensing.

Finding: Connecticut, which is a member of the NERB; Kentucky, which is a member of the SRTA; Utah, which is a member of the WREB; Vermont, which is a member of the NERB; and West Virginia, which is a member of the NERB, accept the results of the North East Regional Board of Dental Examiners, the Southern Regional Testing Agency, the Western Regional Examining Board, and the Central Regional Dental Testing Service examinations as qualification for licensing.<sup>11</sup>

- (5) **Claim:** Candidates taking regional examinations will have to travel out of state and provide transportation and lodging for their patients, assistants, equipment, and supplies. This is exclusionary to candidates who do not live or go to school in a state that is a member of a regional testing agency.

Finding: The WREB administered its examination in California twice during 1999.<sup>12</sup> California has five dental schools and is not a member of a regional testing agency.<sup>13</sup>

Neither the CRDTS nor the SRTA administer their examination in nonmember states. The NERB occasionally administers its examination in three nonmember states.

Candidates who go to school in Alabama, Florida, Indiana, Louisiana, Mississippi, North Carolina, and Puerto Rico would have to travel to a neighboring dental licensing jurisdiction to take a regional examination.<sup>14</sup>

Even if Hawaii were to become a member of a regional testing agency, the decision to administer a regional examination in the islands would depend on the availability of appropriate testing facilities and meeting the minimum number of candidates needed for the examination to pay for itself. See Table 12 below.

- (6) **Claim:** It will cost the State more (in terms of money) to become a member of a regional testing agency than to administer the Hawaii dental licensing examination. Regional testing agencies will not allow the State to participate in their examinations without some form of compensation for administering the examinations.

Finding: There is no fee to become a member of the NERB or the WREB. There is a yearly fee of \$100 to become a member of the SRTA. There is a one-time fee of \$5,000, which is negotiable, to become a member of the CRDTS. Non-member states are not presently charged a fee to use the results of a CRDTS, NERB, SRTA, or WREB examination. See Table 12 below.

- (7) **Claim:** Regional testing agencies do not allow foreign dental school graduates to take their examinations without further education.

Finding: According to the WREB:<sup>15</sup>

. . . [I]f Hawaii agrees to accept WREB results (even without becoming a member) we would require a letter from the Hawaii state board stating that the individual [*i.e.*, a foreign dental school graduate] is eligible for licensure in Hawaii. We could then test the applicant. Without the letter we would not be able to allow the candidate to take the examination.

See Table 12 below for information concerning the NERB, the SRTA, and the CRDTS.

- (8) **Claim:** The nearest regional examination is administered by the WREB in Arizona. Candidates will need to travel to Arizona with their patients, assistants, equipment, and supplies after graduation to take this examination.

Finding: The WREB administered its examination in four member states during 1999: Oklahoma (once); Oregon (twice); Texas (four times); and Washington (once).<sup>16</sup> The WREB also administered its examination in five nonmember states during 1999: Virginia (once); California (twice); Nebraska (once); Ohio (once); and Colorado (once). Virginia is a member of the SRTA; Nebraska and Colorado are members of the CRDTS; Ohio is a member of the NERB; and California is not a member of any regional testing agency.<sup>17</sup> The sites chosen for the WREB examination, both in member states and

nonmember states, were schools with accredited predoctoral dental programs (*i.e.*, programs leading to the D.D.S. or D.M.D. degree).<sup>18</sup> Although Alaska, Arizona, Idaho, Montana, New Mexico, and Utah are members of the WREB too, there are no dental facilities in these states for appropriately conducting large-scale clinical examinations.<sup>19</sup>

Because examination sites often fill up prior to the application deadline, the WREB advises candidates to apply early in order to increase their chances of receiving the location and date of their choice.<sup>20</sup> Any WREB examination having less than sixty candidates by the application deadline, however, may be canceled. In comparison, the Hawaii dental licensing examination is held twice a year (usually during February and August) and announced sixty days in advance.<sup>21</sup> The Board of Dental Examiners has never canceled a dental licensing examination or restorative technique examination, and must conduct these examinations for the same fees even if there was only one candidate by the application deadline.<sup>22</sup> When demand is great—as it usually is during the August administration of the dental licensing examination, the Board of Dental Examiners will conduct the examination on two consecutive weekends so that all candidates can be accommodated.

Alabama, Delaware, Louisiana, and Mississippi, which do not use a regional testing agency, hold their state dental licensing examinations once a year.<sup>23</sup>

The dental schools that host WREB examinations have agreed to provide the following expendable materials: anesthetic (local and topical), amalgam capsules, articulating paper, autoclave tape, cement, cotton pellets, cotton rolls, cotton swabs, cotton squares, deck paper, disinfectant, drinking cups, evacuator tips, face masks, facial tissue, floss, gloves, headrest covers, hemodent, impression materials, matches, mouth wash, needles (long and short), paper towels, patient bibs, polishing materials for restoration, prophylactic paste, retractive cord, rubber dams, rubber dam napkins, soap, standard saliva ejectors, disposable trays, trash bags, and tray covers.<sup>24</sup> The schools also provide X-ray developer and fixer, automatic and/or hand developers, a chair, a unit, and an operator's stool.

Candidates must furnish their own high and low speed handpieces, two new (unscratched) front surface mouth mirrors, a new (sharp) pigtail explorer, a new (sharp) shepard's hook explorer, a new (sharp) ODU (perio) explorer, a new probe color coded with legible 3-6-9-12 millimeter markings, a blood pressure measuring device, and a sharpened pencil. Schools generally have equipment available for rental if candidates choose not to bring their own.

Graduating seniors may take the WREB examination during their final semester, with certification from the school Dean.<sup>25</sup> Verification of graduation must be provided to individual states in order to receive a license. Successful completion of parts I and II of the National Board Dental Examinations is not a prerequisite to taking the WREB examination.<sup>26</sup> Part I of the National Board Dental Examinations, however, is usually taken after two years of dental school; part II is usually taken during the last year of dental school.<sup>27</sup> Consequently, it is possible for a graduating senior to successfully

complete parts I and II of the National Board Dental Examinations and to pass the WREB examination prior to graduation.

- (9) **Claim:** Students who go to school in the ten states that do not participate in regional examinations and Puerto Rico, and who want to practice in Hawaii will be handicapped by the high costs of regional examinations.

Finding: The fee for the WREB examination ranges from a low of \$950 (Oklahoma City, Oklahoma) to a high of \$1,050 (Richmond, Virginia).<sup>28</sup> The fee for the Hawaii dental licensing examination is \$545 (application fee - \$45 plus examination fee - \$500); the fee for the restorative technique examination is \$245 (application fee - \$45 plus examination fee - \$200).<sup>29</sup> Foreign dental school graduates who pass the restorative technique examination are not required to pay the \$45 application fee for the Hawaii dental licensing examination; their combined fee is \$745, assuming they pass both examinations on the first attempt.<sup>30</sup>

- (10) **Claim:** Regional examinations are intended to enable states that are in close proximity to one another to administer a licensing examination; Hawaii is over 2,000 miles away from any other state.

Finding: Alaska and Washington are members of the WREB.<sup>31</sup> Juneau, Alaska, is 913 miles (1,469 kilometers) (793 nautical miles) from Olympia, Washington, as the crow flies.<sup>32</sup> The WREB examination is not administered in Alaska; however, it is administered in Washington.<sup>33</sup>

- (11) **Claim:** Ten states, Puerto Rico, and the U.S. Virgin Islands do not participate in regional examinations because they feel that the examinations inadequately evaluate candidates for licensure within their jurisdiction.

Finding: Forty states and the District of Columbia use a regional testing agency.<sup>34</sup> In addition, according to the American Student Dental Association's *Guide to Dental Licensure* (1999), six nonmember states accept the results of the CRDTS examination; two nonmember states accept the results of the NERB examination;<sup>35</sup> eight nonmember states accept the results of the SRTA examination;<sup>36</sup> and eight nonmember states accept the results of the WREB examination.<sup>37</sup>

The abovementioned ten states, Puerto Rico, and the U.S. Virgin Islands do not simultaneously administer a clinical licensing examination and use a regional testing agency.<sup>38</sup>

- (12) **Claim:** During the administration of the NERB examination, an examiner is often standing next to a candidate while the candidate is working. The NERB examination process does not provide total anonymity to the candidate.

Finding: According to the Chairman of the North East Regional Board of Dental Examiners, anonymity is preserved between the grading examiners and the candidates.<sup>39</sup>

This individual may have taken the NERB examination when preserving anonymity between the grading examiners and the candidates was not a common practice or may have been referring to a nongrading floor examiner. The Bureau notes that some of the confusion may stem from the different powers and duties of nongrading floor examiners in the NERB and in Hawaii.

- (13) **Claim:** The Board of Dental Examiners has established by statute, the requirement that candidates for dental licensing pass a written and practical examination. There are regional examinations that could replace the Hawaii dental licensing examination. The Board of Dental Examiners already requires applicants to pass two national dental examinations in addition to the Hawaii dental licensing examination.

Finding: The Legislature—not the Board of Dental Examiners—established these requirements. Section 448-10, *Hawaii Revised Statutes*, directs the Board of Dental Examiners to “require all applicants [*i.e.*, candidates for licensing] to take the state written and practical examination on dentistry”. Section 448-9(3)(B) and 448-9.5(a)(3)(D), *Hawaii Revised Statutes*, require candidates for licensing to pass parts I and II of the National Board Dental Examinations developed and administered by the Joint Commission on National Dental Examinations.

Parts I and II of the National Board Dental Examinations are written tests, not practical tests.<sup>40</sup> The Hawaii dental licensing examination contains two written tests: one on prosthodontics (*i.e.*, prosthetics) and one on oral pathology, diagnosis, oral medicine, radiology, and comprehensive treatment planning.<sup>41</sup> Part I of the National Board Dental Examinations covers the basic biomedical sciences (*i.e.*, anatomy, biochemistry-physiology, microbiology-pathology, and dental anatomy and occlusion).<sup>42</sup> Part II of the National Board Dental Examinations covers the clinical dental sciences (*i.e.*, operative dentistry, pharmacology, endodontics, periodontics, oral and maxillofacial surgery, pain control, prosthodontics, orthodontics, pediatric dentistry, oral pathology, and dental radiology), behavioral science, dental public health, and occupational safety.

In 1938, the American Dental Association eliminated part III of the National Board Dental Examinations—the clinical part, declaring individual states responsible for determining clinical competency.<sup>43</sup> In 1995, the CRDTS and the NERB developed the Combined Regional Examination (CORE), which dissolved in 1996.

- (14) **Claim:** Because there are so many other states involved with a regional examination, it can be difficult to update or change examination procedures and processes without adversely impacting candidates.

Finding: To be a meaningful statement, the updating or changing of regional examination procedures and processes should be compared to the procedures and processes required by the Hawaii Administrative Procedure Act (chapter 91, *Hawaii Revised Statutes*) to amend chapter 16-79, Hawaii Administrative Rules (Department of Commerce and Consumer Affairs; Dentists and Dental Hygienists).

**Part II: Regional Testing Agencies**

**Table 12: Overview of the Four Regional Testing Agencies**

	<b>CRDTS</b>	<b>NERB</b>	<b>SRTA</b>	<b>WREB</b>
Are states presently charged any fees to become a member of your organization?	\$5,000 one-time fee, which is negotiable <sup>44</sup>	No	\$100 per year	No
Are non-member states presently charged any fees to use the results of your exam?	No	No	No	No
Are graduates of unaccredited (foreign) dental schools allowed to take your exam without completing any further educational requirements?	Yes, if a state certifies that an applicant is eligible for licensure in that state  Currently, Hawaii <u>would</u> have to become a member of the CRDTS in order for the applicant to be tested <sup>45</sup>	Yes, if a state certifies that an applicant is eligible for licensure in that state  Hawaii <u>would not</u> have to become a member of the NERB in order for the applicant to be tested <sup>46</sup>	Yes, if a state certifies that an applicant is eligible for licensure in that state  Hawaii <u>would not</u> have to become a member of the SRTA in order for the applicant to be tested <sup>47</sup>	Yes, if a state certifies that an applicant is eligible for licensure in that state  Hawaii <u>would not</u> have to become a member of the WREB in order for the applicant to be tested <sup>48</sup>
In which states are your exam administered?	CO, IA, IL, MN, MO, NE, WI	CT, DC, IL, MA, MD, MI, NJ, NY, OH, PA, WV  Occasionally in KY, TN, VA	GA, KY, SC, TN, VA	CA, CO, NE, OH, OK, OR, TX, VA, WA
Are any sites in these states closed to persons other than graduates and former graduates of the school?	No	No, several sites give priority to current or former graduates <sup>49</sup>	No, graduates are placed first only on pre-graduation exams <sup>50</sup>	No
Has your organization ever cancelled an exam because not enough candidates were registered to take the exam?	No	No <sup>51</sup>	No	No <sup>52</sup>
How is representation on the governing body of your organization determined?	Each state has an equal number of votes on the Steering Committee	Each state has an equal number of votes on the Steering Committee <sup>53</sup>	State board members (the number of which varies) have 1 vote each in the General Assembly <sup>54</sup>	Each state has an equal number of votes

## Endnotes

<sup>1</sup> The Bureau discovered several inconsistencies in the American Student Dental Association's *Guide to Dental Licensure*. The managing editor of the *Guide to Licensure* was informed of these inconsistencies and is researching this matter. Interview with Janine Marte, Managing Editor, *Guide to Dental Licensure*, November 5, 1999.

These inconsistencies may be the result of different reporting protocols and procedures being utilized for different parts of the *Guide to Licensure* (e.g., requirements for initial licensure versus requirements for licensure by credentials).

<sup>2</sup> In addition, examiners are calibrated differently in the WREB and Hawaii. Interview with Ms. Linda Paul, Executive Director, Western Regional Examining Board, October 7, 1999.

<sup>3</sup> American Dental Association, American Association of Dental Examiners, and American Association of Dental Schools, Joint Committee on Examiner Calibration, "Guidelines for Examiner Standardization" (Chicago: October 1998), p. 7.

<sup>4</sup> American Dental Association, "ADA News Daily, March 13, 1997", <http://www.ada.org/adapco/daily/9703/0313aade.html> (May 15, 1998). *Note: this article is no longer available online from the ADA.*

<sup>5</sup> American Dental Association, *1998 Survey of Clinical Testing Agencies* (Chicago: December 1998), Table B.3a.

<sup>6</sup> Hawaii, Board of Dental Examiners, "Minutes of Meeting; Thursday, May 6, 1999", p. 6-7.

With the addition of a nonpatient test on periodontal diagnosis and treatment planning, the dental licensing examination would then seem to encompass at least eleven of the twelve minimum common core requirements identified in the *Guidelines for Valid and Reliable Dental Licensure Clinical Examinations* (May 1992).

"Root planing" (periodontics) would be the twelfth minimum common core requirement.

<sup>7</sup> American Dental Association, *1998 Survey of Clinical Testing Agencies* (Chicago: December 1998), Table B.3a.

<sup>8</sup> The inability of a candidate to procure acceptable patients is the functional equivalent of failing the class II amalgam test or the class III/IV composite test, or both.

<sup>9</sup> American Dental Association, *1998 Survey of Clinical Testing Agencies* (Chicago: December 1998), Table B.3a.

<sup>10</sup> "Cast gold restoration" would be the twelfth minimum common core requirement.

<sup>11</sup> American Student Dental Association, *Guide to Dental Licensure* (Chicago: 1999), pp. 34-43.

A September 1998 chart published by the American Dental Association indicates that Connecticut, Kentucky, New Hampshire, Utah, and Vermont accept all four regional testing agency examinations as qualification for licensing. American Dental Association, "Dental Licensing Jurisdictions of the United States" (September 1998), 2 pp.

<sup>12</sup> The WREB examination was given at Loma Linda University (Loma Linda, California) from March 19-23, 1999, and at University of the Pacific (San Francisco, California) from June 11-14, 1999.

<sup>13</sup> The five schools are: Loma Linda University (Loma Linda, California); the University of California at Los Angeles (Los Angeles, California); the University of Southern California (Los Angeles, California); the University of California (San Francisco, California); and the University of the Pacific (San Francisco, California). American Dental Association, "Accredited Program Listing: Dental Schools in the U.S. and Canada", <http://www.ada.org/prac/careers/apl-01.html> (October 13, 1999).

American Student Dental Association, *Guide to Dental Licensure* (Chicago: 1999), pp. 24 and 28-29.

<sup>14</sup> None of these states is a member of a regional testing agency, and no regional testing agency administers its examination in these states.

<sup>15</sup> Letter from Ms. Linda Paul, Executive Director, Western Regional Examining Board, to the writer, November 2, 1999, 1 p.

Ms. Paul's letter, as well as a sample agreement between the WREB and a member state, are included in this report as Appendix D.

<sup>16</sup> Western Regional Examining Board, "Dental Examination Schedule for 1999", <http://www.wreb.org/DentalPage/SitesFees.html> (May 11, 1999).

<sup>17</sup> American Student Dental Association, *Guide to Dental Licensure* (Chicago: 1999), pp. 28-43.

<sup>18</sup> American Dental Association, "Dental Schools in the U.S. and Canada: Accredited Program Listing", <http://www.ada.org/prac/careers/apl-01.html> (October 13, 1999).

<sup>19</sup> Interview with Ms. Linda Paul, Executive Director, Western Regional Examining Board, November 3, 1999.

<sup>20</sup> Western Regional Examining Board, "WREB Policies", [http://www.wreb.org/Dental\\_Page/WREBPolicies.html](http://www.wreb.org/Dental_Page/WREBPolicies.html) (May 11, 1999).

<sup>21</sup> American Student Dental Association, *Guide to Dental Licensure* (Chicago: 1999), pp. 28-33.

<sup>22</sup> Interview with Mr. James Kobashigawa, Executive Officer, Board of Dental Examiners, Department of Commerce and Consumer Affairs, Professional and Vocational Licensing Division, November 18, 1999.

The application and examination fees are established by rule. Section 16-53-19, Hawaii Administrative Rules (Department of Commerce and Consumer Affairs; Fees Relating to Boards and Commissions; Dentistry).

<sup>23</sup> American Student Dental Association, *Guide to Dental Licensure* (Chicago: 1999), pp. 28-33.

<sup>24</sup> Western Regional Examining Board, *1999 Dental Candidate Guide* (Phoenix: 1999), pp. 5-6.

<sup>25</sup> Western Regional Examining Board, "WREB Policies", [http://www.wreb.org/Dental\\_Page/WREBPolicies.html](http://www.wreb.org/Dental_Page/WREBPolicies.html) (May 11, 1999).

<sup>26</sup> American Dental Association, *1998 Survey of Clinical Testing Agencies* (Chicago: December 1998), Table A.2.

<sup>27</sup> American Dental Association, "National Board Dental Examination Program", <http://www.ada.org/prac/careers/natbd.html> (October 13, 1999).

<sup>28</sup> Western Regional Examining Board, "Dental Examination Schedule for 1999", <http://www.wreb.org/DentalPage/SitesFees.html> (May 11, 1999).

<sup>29</sup> Hawaii, Department of Commerce and Consumer Affairs, "Application for License – Dentist", Form DT-01 298, 2 pp.

<sup>30</sup> Hawaii, Department of Commerce and Consumer Affairs, "Requirements for License", Form DT-03 298, 2 pp.

<sup>31</sup> Western Regional Examining Board, "WREB Member States", <http://www.wreb.org/WREBGenInformation/MemStates.html> (May 11, 1999).

- <sup>32</sup> Bali Online: The Ultimate Source of Bali (and Distance!) Info., “Distance Result”, <http://www.indo.com/cgi-bin/dist?place1=juneau%2C+alaska&place2=olympia%2C+washington> (November 2, 1999).
- <sup>33</sup> Western Regional Examining Board, “Dental Examination Schedule for 1999”, <http://www.wreb.org/DentalPage/SitesFees.html> (May 11, 1999).
- <sup>34</sup> American Student Dental Association, *Guide to Dental Licensure* (Chicago: 1999), pp. 34-43.
- <sup>35</sup> According to Dr. Joseph Rossa, Chairman of the North East Regional Board of Dental Examiners, three nonmember states use the NERB examination as qualification for licensure. - Rossa, Chairman, North East Regional Board of Dental Examiners, to the writer, October 27, 1999, 4 pp.
- <sup>36</sup> According to Ms. Laura Slaughter, Executive Director of the Southern Regional Testing Agency, six nonmember states use the SRTA examination as qualification for licensure. Letter from Ms. Laura Slaughter, Executive Director, Southern Regional Testing Agency, to the writer, October 22, 1999, 2 pp.
- <sup>37</sup> According to Ms. Linda Paul, Executive Director of the Western Regional Examining Board, nine nonmember states use the WREB examination as qualification for licensure. Letter from Ms. Linda Paul, Executive Director, Western Regional Examining Board, to the writer, October 12, 1999, 3 pp.
- <sup>38</sup> American Student Dental Association, *Guide to Dental Licensure* (Chicago: 1999), p. 24.
- <sup>39</sup> Interview with Dr. Joseph Rossa, Chairman, North East Regional Board of Dental Examiners, November 5, 1999.
- <sup>40</sup> American Dental Association, “National Board Dental Examination Program, August 1999”, <http://www.ada.org/prac/careers/natbd.html> (October 13, 1999).
- <sup>41</sup> Section 16-79-90(b) and (c)(2)(D), Hawaii Administrative Rules (Department of Commerce and Consumer Affairs; Dentists and Dental Hygienists).
- <sup>42</sup> American Dental Association, “National Board Dental Examination Program, August 1999”, <http://www.ada.org/prac/careers/natbd.html> (October 13, 1999).
- <sup>43</sup> American Student Dental Association, *Guide to Dental Licensure* (Chicago: 1999), p. 18. (Adapted from “The History of the Regional Dental Clinical Examinations” by David DeMarais, published in the Journal of the Michigan Dental Association, November/December 1990.)
- <sup>44</sup> Interview with Ms. Cynthia Barrett, Executive Director, Central Regional Dental Testing Service, November 10, 1999.
- <sup>45</sup> Interview with Ms. Cynthia Barrett, Executive Director, Central Regional Dental Testing Service, November 16, 1999.
- Ted Carter, [crdts@networksplus.net](mailto:crdts@networksplus.net), “RE: Regional Boards Survey”, November 18, 1999. Personal e-mail to writer (November 18, 1999).
- <sup>46</sup> Interview with Dr. Joseph Rossa, Chairman, North East Regional Board of Dental Examiners, November 5, 1999.
- <sup>47</sup> Interview with Ms. Laura Slaughter, Executive Director, Southern Regional Testing Agency, November 17, 1999.
- <sup>48</sup> Letter from Ms. Linda Paul, Executive Director, Western Regional Examining Board, to the writer, November 2, 1999, 1 p.

*REGIONAL EXAMINATION*

<sup>49</sup> If current or former graduates do not fill the available chairs, then non-graduates of the school are assigned. Letter from Dr. Joseph Rossa, Chairman, North East Regional Board of Dental Examiners, to the writer, October 27, 1999, 4 pp.

<sup>50</sup> The first six examinations of each year are pre-graduation examinations where graduates are placed first and any remaining operatories are filled on a first-come, first-served basis. All others are completely open examinations. Letter from Ms. Laura Slaughter, Executive Director, Southern Regional Testing Agency, to the writer, October 22, 1999, 2 pp.

<sup>51</sup> There are a minimum number of candidates needed for the examination to pay for itself. If that minimum is not met, the fee per candidate may be raised to meet the minimum cost of the exam or the candidates may be rescheduled at other sites. Letter from Dr. Joseph Rossa, Chairman, North East Regional Board of Dental Examiners, to the writer, October 27, 1999, 4 pp.

<sup>52</sup> On one occasion a small response necessitated raising the exam fee to cover expenses, but candidates chose to pay the higher fee and the exam was not cancelled – this was in Virginia in 1984. Letter from Ms. Linda Paul, Executive Director, Western Regional Examining Board, to the writer, October 12, 1999, 3 pp.

<sup>53</sup> The Steering Committee is responsible for examination issues. Interview with Dr. Joseph Rossa, Chairman, North East Regional Board of Dental Examiners, November 5, 1999.

<sup>54</sup> Interview with Ms. Laura Slaughter, Executive Director, Southern Regional Testing Agency, November 11, 1999.

## Chapter 7

### POLICY OPTIONS AND CONCLUDING REMARKS

#### Appropriate Test or Undue Exclusionary Barrier?

This report reviews selected issues concerning the dental licensing examination. Even with the assistance of the Board of Dental Examiners and the Department of Commerce and Consumer Affairs, the Bureau does not possess adequate expertise in the fields of dentistry or psychometry, much less both, to conduct an expert level of review of this or any other professional licensing examination.

The Bureau cannot conclude that the dental licensing examination, as a technical matter, is either an appropriate test for professional competency or an undue exclusionary barrier to entry into the profession. While testing is a science in itself, it is an imperfect science. There is no such thing as a perfect test. Some of the Bureau's observations in Chapter 4, including, among others, the finding that:

- (1) Not enough potential examiners were initially deemed qualified to grade and, consequently, administer the August 1999 dental licensing examination because of too many unacceptable performances on the calibration examination administered to all grading examiners; and
- (2) Several errors in the grading (rating) criteria for the dental licensing examination have not been corrected through the rulemaking process;

indicate that the examination process is less than perfect. As the so-called "corrections" described in paragraph (2) are listed on a separate errata sheet and have never been adopted through the rulemaking process, it would appear that the Board cannot validly apply them.

On the other hand, a court-appointed master and an impartial observer hired as a consultant have reviewed the dental licensing examination very favorably. The review by the impartial observer in 1995 found that the examination compared "very favorably with six other independent State Boards of Dentistry [sic]", and that the examination contained "no major deficiencies and only several minor difficulties that are easily remedied." The Bureau has no basis to doubt the findings of the impartial observer, and finds no compelling evidence to conclude that the examination is defective in any significant way.

## Policy Options and Special Conditions

At the legislative level, the ultimate policy issue that the Legislature must decide is whether to: (1) retain the state-constructed dental examination (the status quo), (2) abolish the state-constructed examination and allow candidates to pass any one of the four regional examinations, or (3) allow candidates to pass either the state-constructed examination or a regional examination. This legislative policy decision is separate and distinct from anyone's opinion on the technical merits or defects of the existing state-constructed dental licensing examination. The Legislature's policy options are described below.

### **Policy Option 1: Retain the dental licensing examination.**

**Pros.** Control over the content and administration of the dental licensing examination would remain exclusively in Hawaii, with the Board of Dental Examiners, the Department of Commerce and Consumer Affairs, the Governor, and the Legislature being able to exercise supervision over the examination by law or rule, or both.

The existing dental licensing examination was evaluated in 1995 as being valid, reliable, and representative of the practice of dentistry by an impartial observer. The February and August 2000 dental licensing examinations will be evaluated again by an impartial observer, which is required at least once every five years by rule.<sup>1</sup>

The Board has never canceled a dental licensing examination, and must conduct the examination for the same fees even if only one candidate applies by the application deadline. When demand is great, the Board has conducted the examination on two consecutive weekends so that all candidates can be accommodated.

Retaining the dental licensing examination would make it affordable for the Board to administer the restorative technique examination to foreign dental school graduates.

**Cons.** The utilization of a state-constructed dental licensing examination exposes the State to potential litigation over the validity, reliability, and fairness of the examination.

As dentistry and testing evolve, the Board must periodically reevaluate the dental licensing examination to ensure that it remains valid, reliable, fair, and representative of the practice of dentistry. Without the assistance of dentists who are educated in testing and psychometricians who are familiar with dentistry, it may, in the future, become difficult for the Board to make necessary changes to the dental licensing examination on a timely basis, or to successfully defend the dental licensing examination in court.

**Policy Option 2: Retain the state-constructed dental licensing examination and also authorize the Board to accept the results of all four regional testing agencies' examinations.**

**Pros.** The Board could use this period to improve and expand its pool of trained, experienced examiners while assessing the immediate impacts of accepting the results of all four regional testing agencies' examinations. Retaining the state-constructed dental licensing examination may help to retain the Board's pool of examiners, the loss of which might make it difficult for the State to reverse course and reestablish the state-constructed examination in a timely and efficient manner if the examination were abolished.

A graduating dental student would be able to successfully complete parts I and II of the National Board Dental Examinations and pass a regional testing agency's examination prior to graduation, without having to return to Hawaii. Upon providing verification of graduation to the Board or the Department of Commerce and Consumer Affairs, or both, a dentist would be eligible to receive a license to practice dentistry in Hawaii.

Candidates who already reside in Hawaii would not have to travel to the mainland (possibly California or the state in which they attended dental school) in order to take a regional testing agency's examination. Candidates who fail a regional testing agency's examination and who cannot afford to reside on the mainland until the next administration of the regional examination could move back to Hawaii and take the state-constructed examination.

**Cons.** No United States dental licensing jurisdiction, including the District of Columbia, Puerto Rico, and the U.S. Virgin Islands, simultaneously administers a clinical licensing examination and uses a regional testing agency.<sup>2</sup>

It is unknown, however, if any of the jurisdictions that currently use a regional testing agency simultaneously administered a clinical licensing examination and used a regional testing agency while transitioning from the former to the latter.

The temporary utilization of a state-constructed dental licensing examination would continue to expose the State to potential litigation over the validity, reliability, and fairness of the examination. Without the assistance of dentists who are educated in testing and psychometricians who are familiar with dentistry, it may, in the future, become difficult for the Board to successfully defend the dental licensing examination in court.

It may become unaffordable for the Board to administer the state-constructed dental licensing examination or the restorative technique examination, or both, if too many dentists opt to take a regional examination instead of the state-constructed examination.

**Policy Option 3: Abolish the state-constructed dental licensing examination and authorize the Board to accept the results of all four regional testing agencies' examinations.**

**Pros:** The utilization of a regional examination may reduce the State's exposure to potential litigation over the validity, reliability, and fairness of the examination. The regional testing agencies have the assistance of dentists who are educated in testing and psychometricians who are familiar with dentistry, and would thus appear to be able to successfully defend their examinations in court, and ensure that the examinations remain valid, reliable, fair, and representative of the practice of dentistry.

A graduating dental student would be able to successfully complete parts I and II of the National Board Dental Examinations and pass a regional testing agency's examination prior to graduation, without having to return to Hawaii. Upon providing verification of graduation to the Board or the Department of Commerce and Consumer Affairs, or both, a dentist would be eligible to receive a license to practice dentistry in Hawaii.

**Cons:** Candidates who already reside in Hawaii may have to travel to the mainland (possibly California or the state in which they attended dental school) in order to take a regional testing agency's examination. Candidates who fail a regional testing agency's examination may not be able to afford the cost of residing on the mainland until the next administration of the regional examination.

Control over the content and administration of a regional testing agency's examination would not reside exclusively in Hawaii, and the Board of Dental Examiners, the Department of Commerce and Consumer Affairs, the Governor, and the Legislature would not be able to exercise supervision over the examination by law or rule, or both.

Regional testing agencies reserve the right to cancel an examination if not enough candidates apply by the application deadline, or to raise the examination fee to cover the cost of its administration. Because examination sites may fill up prior to the application deadline, candidates may need to apply early in order to increase their chances of receiving the location and date of their choice.

The Board may lose its pool of trained, experienced examiners. The loss of the Board's examiner pool might make it difficult for the State to reverse course and reestablish the state-constructed dental licensing examination in a timely and efficient manner at a later date.

It may become unaffordable for the Board to administer the restorative technique examination to foreign dental school graduates if the dental licensing examination is abolished.

## Policy Options; Concluding Remarks

The question of whether to authorize the Board of Dental Examiners to accept the results of all four regional testing agencies' examinations does not depend on a determination that the existing state-constructed dental licensing examination is an undue exclusionary barrier to entry into the profession. Instead, this question depends on whether the Legislature's desire for local control of the dental licensing examination, if any, outweighs its concerns about state liability for alleged or proven injustices, convenience and affordability for candidates, and ongoing program costs to the State. If the Legislature finds the dental licensing examination to be deficient in any respect, one option is to fix the deficiency. Abolishing the dental licensing examination is not the only option available to the Legislature. But the Legislature cannot hope to retain the state-constructed examination while avoiding the cost to and potential liability of the State.

## Special Conditions

**If the Legislature requires, rather than authorizes, the Board to accept the results of all four regional testing agencies' examinations**, then the Bureau suggests that the Board be allowed to reject the results of a regional testing agency's examination if the Board finds that the examination:

- (1) Is not based only upon the present state of dental practice and current trends in dental education;
- (2) Fails to utilize only valid and reliable test and measurement procedures;
- (3) Fails to employ only comprehensive objective criteria for measuring the competence of candidates; or
- (4) Fails to assure that the examination is anonymous in all respects.

These are the same conditions that appear in the *Pekarsky* settlement agreement (see Chapter 1).

**If the Legislature abolishes the dental licensing examination and the restorative technique examination**, then the Bureau suggests that the Board be allowed, by rule, to require foreign dental school graduates to obtain supplementary education in a dental school or advanced dental program that is accredited by the Council on Dental Accreditation of the American Dental Association.

## Endnotes

<sup>1</sup> Section 16-79-115(d), Hawaii Administrative Rules (Department of Commerce and Consumer Affairs; Dentists and Dental Hygienists).

<sup>2</sup> American Student Dental Association, *Guide to Dental Licensure* (Chicago: 1999), pp. 28-43.

American Dental Association, "Dental Licensing Jurisdictions of the United States" (September 1998), 2 pp.

# Appendix A

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C.D. 1

1 whether regulation would be more efficiently and cost  
2 effectively administered by:

3 (A) A regulatory board;

4 (B) The department of commerce and consumer affairs;  
5 or

6 (C) An alternative regulatory mechanism.

7 (c) The auditor shall submit to the legislature a report of  
8 the findings and recommendations concerning the regulation of  
9 speech pathologists and audiologists no later than twenty days  
10 before the convening of the regular session of 2000, and the  
11 regulation of barbering and beauty culture no later than twenty  
12 days before the convening of the regular session of 2001.

13 **PART III**

14 **STUDY RELATING TO DENTISTRY**

15 SECTION 6. The legislative reference bureau, with the  
16 assistance of the board of dental examiners and the department of  
17 commerce and consumer affairs, shall conduct a study of the  
18 state-constructed dental licensing examinations used by the  
19 board. The study shall include a determination of the following  
20 questions:

21 (1) Given examination pass rates since 1992, does the state  
22 constructed dental licensing examination, including  
23 proposed changes to the examination, **appropriately test**

1 for professional competency in the field of dentistry  
2 or serve as an undue exclusionary barrier to entry to  
3 the profession? In considering this question, the  
4 legislative reference bureau shall compare the dental  
5 licensing examination pass rates of the following  
6 groups of applicants:

7 (A) Graduates of institutions located in the United  
8 States and accredited by an accreditor recognized  
9 by the United States Secretary of Education;

10 (B) Graduates of institutions located in the United  
11 States not accredited by an accreditor recognized  
12 by the United States Secretary of Education;

13 (C) Graduates of institutions located in foreign  
14 countries that are accredited by the governments  
15 of those countries; and

16 (D) Graduates of institutions located in foreign  
17 countries that are not accredited by the  
18 governments of those countries;

19 (2) Should any of the four regional dental examinations be  
20 used in lieu of, or as an alternative option to, the  
21 state-constructed dental licensing examination and, if  
22 so, under what conditions; and

23 (3) Any other questions pertinent to an evaluation and

1 determination of the fairness of the state-constructed  
2 dental licensing examination under section 26H-2,  
3 Hawaii Revised Statutes, criteria.

4 The legislative reference bureau shall submit the requested  
5 report with its findings, recommendations, and proposed  
6 legislation, if necessary, to the legislature not later than  
7 twenty days prior to the convening of the regular session of  
8 2000.

9 SECTION 7. Statutory material to be repealed is bracketed\_

10 SECTION 8. This Act shall take effect upon its approval.

## Appendix B

# Impartial Observer Report Hawaii Board of Dental Examiners

February 24-26, 1995

and

August 11-13, 1995

Frank J. Courts D.D.S., Ph.D.

### I. Introduction

As described by the Hawaii Administrative Rules section 16-79-115, the February 24-26, 1995 and the August 11-13, 1995 Dental Licensure Examinations were monitored by an impartial observer, appointed by the Department of Commerce and Consumer Affairs. The following report is a compilation of the observations of the impartial observer during these two Dental Licensure Examinations.

### II. Examination Materials

#### A. Hawaii Administrative Rules

Title 16, Chapter 79

Dentists and Dental Hygienists

#### B. Instructions and Information for Dental Licensure

Examination and attachments (February 1995 and August 1995)

#### C. Reports on August 1994, February 1995, and August 1995 Dental Licensure Examination

#### D. Instructions and Information for Non-accredited School

Examination and Attachments (February 1995 and August 1995)

#### E. Chapter 448, Hawaii Revised Statutes, Dentistry

All pre-examination materials were provided, for the observer in a timely manner. The instructions to the candidates were complete and well written and extremely thorough. They adequately detailed the guidelines of the examination and all pre-examination preparation for the candidates. The quality of this document was excellent.

**III. Grader Standardization and Calibration Session**

The grader standardization and calibration sessions were held on February 24, 1995 and August 11, 1995 and were conducted by Dr. Robert Christoffersen. The candidate and grader performance from the previous examination were examined in detail. Areas of concern were addressed by Dr. Christoffersen and reviewed by the Board members and potential graders. Subsequently, all components of the clinical and laboratory examinations were individually reviewed by Dr. Christoffersen. Examination procedures were identified and the grading standard was established after extensive input from the members of the Hawaii Board of Dental Examiners. A criterion based scoring system was used as the basis for the evaluation of all clinical procedures that would be graded in the examination. The standardization process was thorough and of the highest quality.

The calibration examination consisted of preparations of dentoform and natural human teeth. The calibration exam was scored in conjunction with the potential graders. Graders who fell outside the limits of critical differences were eliminated from grading the subsequent practical examination. The quality of the overall standardization/calibration process was judged to be excellent.

**IV. Candidate Orientation Session**

The candidate orientation sessions were conducted by Dr. Marcy Kawasaki-Haines, Board Chairperson and Dr. Milton Fujiuchi, Board Member, and Ms. Jodi Leandro, Licensing Examiner. The components and procedures of the examination were addressed in a cordial and informative manner. Candidates were permitted to ask questions and resolve procedural issues. The session was well conducted and served not only to prepare the candidates for the examination process and give them a chance to ask questions but also to put them at ease.

**V. Written and Differentiation Examinations**

The Written and Differentiation Examinations were held on February 24, 1995 and August 11, 1995 immediately following the candidate orientation session. This component of the examination was not

observed because of participation in the standardization and calibration sessions. Verbal reports by Ms. Jodi Leandro indicated that this session went without incident. It should be noted that Ms. Dawn Kubota indicated that the written examination has undergone periodic revision. but the differentiation examination has remained unchanged since 1990.

#### **VI. Practical Examination**

The observed practical examinations were conducted on February 25-26, 1995 and August 12-13, 1995 at the Pearl Harbor Naval Dental Clinic. it should be noted that the facilities at the Naval Dental Clinic are not well suited for a practical dental examination process.

However, the organization of the Hawaii Board of Dentistry and the staff associated with this group compensated in a quality manner. All Board members were extremely knowledgeable of the examination process and had a genuine concern to conduct an examination of the highest quality. The graders that were selected were well prepared and showed a high level of professionalism. The Examination Branch staff were aware of all examination rules and requirements, were extremely helpful to all individuals involved in the examination, and provided continuity to a very time constrained and complex examination. A cadre of part-time Examination Branch employees were essential in performing candidate time tracking and acted as monitors to assure anonymity. Dental hygiene students assisted graders and assured infectious disease control in the clinical grading area. Technical support staff from the Naval Dental Clinic assured that the dental facilities did not compromise the examination process for any candidate.

Specific examination observations: Both examinations were conducted in an anonymous fashion. All individuals involved in administration of the examinations were observed to be helpful and respectful to the candidates. All clinical grading was conducted in a professional manner. Interaction between graders was minimal and grades were arrived at in an independent manner by all graders. No evidence of collusion by examination personnel was observed. Many

**candidates did not appear to be adequately prepared to take a licensure examination. In general, patient selection was poor and many candidates appeared unfamiliar with the pre-examination instructions that were provided to them.**

**In summary, the administration of the practical examination was found to be of exceptional high quality.**

## **VII. Post Examination Analysis**

**The post examination analysis conducted by the Examination Branch was found to be accurate and of high quality. The pass rates for the examinations and individual components were clear and accurate. The mean scores, frequency distribution data, and critical difference analyses, were accurate and reflected a careful effort by the Examination Branch staff.**

## **VIII. Recommendations**

### **A. Candidate Examination Materials**

**The candidate examination materials were found to be excellent. They reflected an on-going effort to maintain current information regarding the Hawaii Dental Examination process.**

**Specific recommendation: Continue to modify these materials as the examination changes. Notification to candidates prior to the examination stressing the importance of good patient selection may be helpful.**

### **B. Grader Standardization and Calibration Sessions**

**The Grader Standardization and Calibration Sessions were found to be outstanding. Dr. Christoffersen does an exceptional job and has the full participation of Hawaii Board Members and graders.**

**Specific recommendation: Continue current process.**

### **C. Candidate Orientation Session**

**The Candidate Orientation Sessions were found to be excellent. The Hawaii Board Members answered all questions and put candidates at ease.**

**Specific recommendation: Refer the candidates to the excellent pre-examination materials. The answers to many questions posed**

by the candidates were available in these materials. Continue the “friendly” approach.

**D. Written and Differentiation Examinations**

The content of the Written Examination was found to be current and reflected an examination of minimal competency. The Differentiation Examination in the area of Prosthodontics remains unchanged from the 1990 examination.

Specific recommendations: Continue to modify the written exam to reflect the current standards in dentistry. Additionally, the Differentiation Examination should be periodically reviewed by the Board for contemporary content in the area of Prosthodontics. The Board should attempt to modify existing items or add new items to the examination on a yearly basis.

**E. Practical Examination Process**

The Practical Examination was found to be conducted in an outstanding manner. The Hawaii Board members and staff exercised judgment, effort and extreme care to administer an examination of the highest quality.

Specific recommendation: None.

**F. Post Examination Analysis (Testing Reliability)**

The Post Examination Analysis report was found to be of high accuracy and quality. Several minor modifications in the reporting format may assist the Board in maintaining the reliability of their examination process.

Specific recommendations:

1. Use the critical difference analysis to evaluate grading reliability of individual examination components. (For example, a critical difference analysis of the full crown wax up from the February and August examinations would have indicated a problem in grading reliability; a greater than 16% critical difference for the entire section in each examination.)
2. To better understand grader performance, it may be more useful to evaluate graders prior to elimination of critically differing grades. This should more accurately reflect any adverse grading trends in average grade and frequency distribution.

**G. Examination Content (Content Validity)**

The examination content was found to adequately address the scope of general dentistry. The Board is encouraged to periodically evaluate the examination content to assure that the examination remains contemporary with the current practice of dentistry. Any statutory limitation restricting updating the content of the examination should be addressed to assure the future quality of the examination.

**Specific recommendations:**

1. Consider elimination of the full crown wax-up since damage frequently occurs to the pattern during grading. Standardization for the grading of this component also appears difficult to achieve.
2. Consider the addition of a non-patient examination of periodontal diagnosis and treatment planning.
3. The laboratory Class II restoration and the clinical Class II restoration are redundant. Consider elimination of one of these procedures to reduce examination time and candidate stress.

#### **H. General Observations and Recommendations**

1. The competency level of candidates that take the Hawaii Board of Dentistry examination appears to be low in comparison to other candidate pools that the impartial observer is familiar with. The historic pass rate on the examination seems to accurately reflect the reduced level of minimal competency in candidates for the Hawaii examination. There was no evidence that the Board has enaaed in behaviors that would exclude competent practitioners of dentistry from obtainina dental licensure in the State of Hawaii. However, one problem associated with the Boards relatively high failure rate is the critical difference analysis that is utilized. A cut-off of graders with a critical difference of greater than 13% was based historically on experience with Boards that had failure rates of between 10 and 20 percent. Since critical differences increase normally with increasing failure rates, a 13% cut-off for the Hawaii examination may be unreasonable.

**Specific recommendation: Change the critical difference cut-off from 13% to 18%.**

2. A national trend has occurred over the past five years in the role of Board members in the grading process. Most Boards have

**excluded Board Members from the examination grading process. This has served two important purposes: a) Board members are free to review candidate result without previous bias and b) problems with individual examination grader performances are more easily remedied.**

**Specific recommendation: Eliminate Board members from the examination grading process.**

**3. The number of grades given by a grader in any examination component should be adequate in number to reflect any abnormal grading trends. Several instances where less than five grades were given by a grader in a section were identified.**

**Specific recommendations: Any grader of an examination component should grade at least ten occurrences of that component.**

## **Summary**

**I observed a highly conscientious examination process during the administration of the clinical dental licensure examination. It compares very favorably with six other independent State Boards of Dentistry that I have direct knowledge of. I found no major deficiencies and only several minor difficulties that are easily remedied. The Hawaii Board of Dentistry should be commended for the high quality of its licensure examination process. My one concern is that statutory limitations on the content of the examination may eventually reduce the quality on the examination. For the licensure examination to remain excellent, it must stay in step with contemporary dentistry. Every attempt should be made to assure the Board possesses adequate flexibility to meet the challenge of licensure in an ever changing dental profession.**

## Appendix C

### Final Conclusions

The August 1989, February 1990 and August 1990 Hawaii dental examinations were the best in quality, reliability, validity, and professionalism of any I have observed over the past twenty years. The Hawaii Dental Examination currently is the most broad based and thoroughly validated evaluation that exists today. These observations are based on the following evidence.

1. The validity and reliability of the examination has been widely tested and documented over the past three years.
2. The content of the examination is broader in nature than any existing examination. This broad content enhances the validity of the examination.
3. The content and reliability of the discrimination examination was thoroughly tested prior to implementation.
4. The standardization process includes testing criteria that prevents individuals who cannot reach an accepted standard from being used as a grader. On two occasions board members have been disqualified from grading because they could not reach an accepted standard. In the February 1990 examination a board member failed to pass the testing examination and was disqualified from grading the evaluations. No other state has this criteria.
5. Comprehensive sets of instructions have been developed for the candidates, graders, and other participants that clearly delineate the responsibilities of each individual involved in the dental examination.
6. Elaborate rules and regulations have been established to:
  - a) protect the identity of the participants from the graders, thereby ensuring an anonymous examination.
  - b) set up a comprehensive appeals process for individuals failing the examination.
  - c) an appeals process that allows for regrading of an examination without retaking the test in cases where anonymity has been broken.
  - d) the establishment of a review process of the examination in a timely manner so that the test does not become obsolete.
  - e) a reporting mechanism has been developed that allows for a detailed statistical analysis following each examination.
7. There has not been a single incident in the past three years in which the principles of anonymity have been broken.

Based on these conclusions, the Court appointed Master finds that the conditions giving rise to the court's continued jurisdiction over the Hawaii dental licensure examination no longer exist. There is no reason for the court to continue its monitoring over the dental licensure examination. Moreover, the promulgation of extensive and elaborate rules by the Board will ensure the same protection against any wrongful conduct by the Board as currently provided by the stipulated orders previously entered by the court. Consequently, the Court appointed Master recommends that the plaintiffs attorneys and the Hawaii state's attorneys draft a final stipulation that relieves the Hawaii Dental Board from the mandates of the federal court.

I would like to thank all the parties involved in this undertaking for their assistance and willingness to seek solutions to sometimes difficult and sensitive problems. These parties include the plaintiffs attorneys, Stanley Levin, Evan Shirley and Elbridge Smith; the representative of the Hawaii Attorney General's Office, Winfred Pong; the staff of the Licensing and Testing Bureau; and the Hawaii Board of Dentistry. I would also like to thank Dr. Frank Courts for his assistance in data evaluation, statistical analysis, and preparation of this final report.

## Appendix D



### WESTERN REGIONAL EXAMINING BOARD

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wrebexam@aol.com

www.wreb.org

*Clinical Examinations in Dentistry*

#### Member States

ALASKA  
ARIZONA  
IDAHO  
MONTANA  
NEW MEXICO  
OKLAHOMA  
OREGON  
TEXAS  
UTAH  
WASHINGTON

To: Keith Fukumoto  
From: Linda Paul  
Date: November 2, 1999

When we spoke recently I told you that I would be meeting with the WREB Board of Directors soon and could **ask them** your question regarding testing graduates of non-accredited schools. You will see from the attached sample agreement on page 2, number 6, section (c) that WREB has a mechanism for testing graduates of non-accredited schools. In order to do so we require a letter from the participating state verifying that the individual meets the requirements for licensure in that state. The WREB Board of Directors believes that the reference to participating states would include any state that accepts the results of WREB for licensure. Therefore, if Hawaii agrees to accept WREB results (even without becoming a member) we would require a letter from the Hawaii State board stating that the individual is eligible for licensure in Hawaii. We could then test the applicant. Without the letter we would not be able to allow the candidate to take the examination\_

I am also enclosing, as requested, a sample agreement **between** WREB and a member state. This agreement is open to revision as required by the participating state, as long as the basic concept remains.

I hope this answers your questions. If ~~I've~~ we failed to respond to any questions, please let me **know**.

## AGREEMENT

AGREEMENT entered into this day of \_\_\_\_\_, 19\_\_\_\_, by and between WESTERN REGIONAL EXAMINING BOARD an Arizona non-profit corporation ("WREB"), and the BOARD OF DENTAL EXAMINERS of the State of \_\_\_\_\_ (the "Board").

WHEREAS, WREB has devised uniform clinical examinations for the testing of candidates for licensure in Dentistry and Dental Hygiene, and has prepared services necessary for the administration of such examinations; and,

WHEREAS, the Board desires to avail itself of the testing services of WREB.

IT IS THEREFORE AGREED:

1. Duties of WREB.

WREB shall provide a clinical examination for candidates for licensure in Dentistry and Dental Hygiene which shall meet the minimum standards for such licensure required by the State of \_\_\_\_\_. In addition to such examinations, WREB will provide sufficient personnel to administer the examination. Such clinical examinations shall be sufficiently comprehensive and realistic as to fairly and reasonably test and reveal the clinical knowledge and competence of the candidates for licensure as Dentists or Dental Hygienists in \_\_\_\_\_.

2. Use of Exam Results by Board

The Board in its capacity and as an agency of the State of \_\_\_\_\_ does hereby agree to accept the results of such clinical examination and treat them in the same way as it would the results of an examination which it might give independently, in order that each applicant passing such examination may be deemed to have fulfilled separate clinical requirements for licensure imposed by the State of \_\_\_\_\_; provided, however, that the Board after a review of the examination and standards to be given, determines that it is, in fact, sufficient to meet the requirements of the State of \_\_\_\_\_.

3. Powers and Duties of Board.

Each of the parties hereto agrees and acknowledges that the Board shall have, in addition to its present and future statutory powers to conduct clinical examinations, the power to conduct and participate in such examinations for the above purpose at such times and places as may be determined by the Board of Directors of WREB and to respectively determine the suitability and effectiveness of such examination and the procedures prescribed therein, and to consider the results of such examination for the same purpose and in the same manner as those obtained from clinical examinations independently and separately conducted by such Board.

**Further:**

- (a) Subject to the limitations and requirements for the laws of the State of \_\_\_\_\_, and in accordance with the conditions and limitations hereinafter contained, the Board shall conduct or participate in as many of the clinical examinations given by WREB in each year as the Board may, in its independent judgment, deem necessary to fulfill the statutory requirements placed upon it by the laws of the State of \_\_\_\_\_.
- (b) The Board may consider as eligible for licensure within the State of \_\_\_\_\_ but is not required to license as Dentists or Dental Hygienists, those applicants passing the clinical examination given by WREB.
- (c) The Board is not hereby, either expressly or by implication, waiving the right to require or give such further examination as it may deem necessary to determine the suitability of candidates for licensure in Dentistry or Dental Hygiene, nor is it precluded from considering any other matter reasonably calculated to aid in its determination of the professional competence and eligibility of such applicants.

**4. Board's Right to be Represented on WREB Board of Directors.**

The Board is hereby entitled to have one of its duly qualified members elected as a Director of WREB pursuant to the By-Laws of the corporation in order to maintain the equal representation of each state participating in the testing services of the corporation, in the administration of the corporation, and the preparation of the examination. Such right to representation on the Board of Directors will continue during the term of this contract and shall be deemed to be terminated simultaneously with this Agreement.

**5. Board May Receive financial Aid.**

The Board may apply for, accept and receive grants, loans, advances, contributions, or any other financial aid from any source, public or private, to aid in its participation herein.

**6. Applications For Examination.**

Applications for such examination shall be limited to:

- (a) Graduates of dental colleges and schools of dental hygiene which are accredited by the Commission on Dental Accreditation.
- (b) Senior students qualified for graduation in a dental or dental hygiene school (accredited by the Commission on Dental Accreditation) whose request for examination by the Corporation is approved by the deans of their schools, as

attested by properly authenticated documents.

- (c) Individuals who can show that they meet all requirements for licensure in one of the states participating in the examination services of the Corporation.
- (d) Practitioners of other dental disciplines requiring testing for licensure, certification, or permitting when deemed appropriate by the Board.

**7. Examination Fees.**

The reasonable and necessary costs incurred in conducting such examinations shall be borne entirely by those applicants taking the examination, and the examination fee required to be paid by such applicants shall be fixed by WREB in such reasonable amount as may be necessary to defray such costs. Such examination fee shall be in addition to that which may be prescribed by the statutes of the State of \_\_\_\_\_ and the Board shall be in no way required to defray the costs of examination incurred by WREB.

**8. Availability of Examination Results.**

WREB will make available to the Board complete details concerning the examination, the circumstances of the examination, and the results of that examination for any applicant who has taken the WREB examination and who may thereafter apply for licensure as a Dentist or Dental Hygienist within the State of \_\_\_\_\_.

**9. Recognition of Examination Results.**

The Board will grant full recognition and credit as hereinabove required to the results of an examination given by WREB for a minimum period of \_\_\_\_\_ years following the date of such examination regardless of the locality of such examination.

**10. Limitation of Benefits.**

No provision hereof shall be construed to qualify for examination or to create any benefit thereunder for any applicant or candidate for licensure who is not otherwise eligible for licensure in the State of \_\_\_\_\_.

**11. Powers of Board are not Impaired.**

Nothing herein contained shall be construed to affect or impair the power, authority and discretion given by statute to the Board acting within the territorial limits of the State of \_\_\_\_\_ to make and enforce laws, rules and regulations governing the practice of Dentistry and Dental Hygiene therein or the examination thereof, such power,

authority and discretion of the said examining authority shall not be superseded or suspended in any respect by reason of this Agreement and all applicants for examination shall comply with and conform to all laws and duly promulgated rules imposed by the State of \_\_\_\_\_ if licensure is being sought therein

**12. Amendment: Termination.**

This Agreement may be amended at any time by agreement in writing executed with the same formality as this document. Further, this Agreement may be terminated at any time by either party upon thirty (30) days written notice mailed to the President or Secretary of the corporation at the address which appears on the corporate records of the corporation.

IN WITNESS WHEREOF, the parties hereto have duly executed this Agreement on this day \_\_\_\_\_ of \_\_\_\_\_.

**WESTERN REGIONAL EXAMINING BOARD**

BY \_\_\_\_\_  
President

ATTEST:

\_\_\_\_\_

BOARD OF DENTAL EXAMINERS OF \_\_\_\_\_

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