Dental Education and Licensure in a “Global World”:
Can Competence be Measured?
Alternate title:

Gerrow is retiring and you have to listen to him one more time
Can competency be measured at the initial entry to practice level to facilitate international portability and ensure protection of the public?

A. Yes
B. No
C. Maybe
Assessment of Professional Competence

Kane, MT, 1992

“Valid assessment of professional competence has proven to be an elusive goal. Objective tests, direct observations, overall ratings ... and simulations have all been tried and found wanting in one way or another.”
Measuring Entry Level Competence

1. Assessment of Written Documents
2. Reciprocal Agreements between Regulatory Authorities
3. Reciprocal Agreements based on Accreditation
4. International Accreditation
5. Portfolios
6. Examinations
The Challenges

Huge variation in regulation of dentistry
• Many countries do not regulate dentistry
• Many countries have initial licensure requirements (generally for protectionist reasons) but do not regulate dentists after initial licensure
The Challenges

• 120 countries with university based dental education
  - most have recognition by government but not accreditation

• 1044 dental programs
  - significant variation in the programs
  - questionable admission processes
  - limited or no patient treatment experience
The Challenges

- Pride and protectionism
- Corruption and fraud
- Variation in quality of graduates from a single program because evaluation systems are not reliable
- Transcripts and degrees from all 1044 dental programs look the same
1. Assessment of Written Documents

- Existing internal process
- Approached by a government approved assessment service.
1. **Country:** Philippines  
   **Credential:** Secondary Student's Permanent Record  
   **Year:** 1985  
   **Awarded by:** Jose Rizal College  
   **Admission requirements:** Elementary education (six years)  
   **Length of program:** Four years  
   **Major/Specialization:** Not applicable  
   **U.S. Equivalency:** High school diploma
3. **Country:** Philippines  
**Credential:** Doctor of Dental Medicine  
**Year:** 1993  
**Awarded by:** National University  
**Admission requirements:** Two years of undergraduate study  
**Length of program:** Four years  
**Major/Specialization:** Dentistry  
**U.S. Equivalency:** Four years of professional study
High school diploma, two years of undergraduate study in liberal arts and science and four years of professional study in dentistry at, a regionally accredited institution
Customized Assessment

Paid by board so requested

- Specific information on minimum admission requirements
- Number of full-time faculty with dental degree
- Number of hours treating patients in university clinic
First professional degree in dentistry requires six years of full-time study; the first degree in dentistry is called *Shigakushigo*. Although this is a first degree, sometimes this is referred to as the Master of Dentistry. Upon completion of the *Shigakushigo*, the holder may be admitted directly to a doctoral programme.
Live Patient Treating Hours
Research & Clinical Facilities

Reliable and consistent information on live patient treatment hours is not currently available. There are four research divisions in the School of Dentistry, they are listed as the following: Morphology, Physiology, Environmental Ecology, and Engineering. The research activities are intended to train dentists with a wide range of problem-solving capacity and highly specialized knowledge.
Programme Faculty

Reliable and consistent information on the faculty make up is not currently available.
We would be able to prepare this report within ten working days of the request, for a fee of $350 (Cdn).

Unfortunately, we are still awaiting for responses at the present time (i.e. such as “# of live-patient hours”,

there is still some outstanding data for which we have still not been able to obtain direct verification

My apologies for the length of time this is taking.
I’m sorry that we couldn’t get the information to you in time for your last meeting.

the profiles, as developed, were not completed as to your specifications.

How about us charging you $275 per profile, for a total of $1100. This would be a reduction in $100 per profile.
Assessment of Written Documents

- Not reliable for determining competency or equivalency
- In depth verification required to detect fraudulent documents
2. Reciprocal Agreements

Between Regulatory Authorities

• Reciprocal license to license
• Regulatory and educational programs must be similar
• Examples
  - EU
  - Quebec - France
  - NZ - Australia
Between Regulatory Authorities

- Western governments (other than US) understand and generally support this approach
- Written agreement after bonafide, in depth process
- Ongoing monitoring
- Should be based on knowledge and trust between regulatory authorities not as a result of political direction
Between Regulatory Authorities

• If small differences are identified may involve internship/local course/examination but must be reasonable
3. Reciprocal Agreements

Between Accrediting Authorities

- Recognize educational outcomes as equivalent
- Examples
  - Canada – US, NZ, Australia, Ireland
Between Accrediting Authorities

- Written agreement after bonafide, in depth process
- Ongoing monitoring
- Mutual recognition of accredited programs as equivalent
- Worst graduate in one jurisdiction is no worse than the worst graduate in the other
Between Accrediting Authorities

- Very few countries have accreditation
- Requires standards, in depth self study and site visits
- Expensive, slow to react
- Governance is critical
  - should not be under a dental association
  - should not be controlled by Deans
  - should not be a private corporation
4. International Accreditation

Options:

• Affiliate with an existing international health accrediting agency - extensive experience in accrediting patient health delivery programs but not education programs

• Existing dental accrediting agency take international lead but should not be under a dental association or controlled by Deans
International Accreditation

- Requires standards, in depth self study and site visits
- Might result in several levels of accreditation status
5. Portfolios

- Students and Faculty create and verify identified learning and competency attainments
- Examples
  - Architecture
  - California
Portfolios

- Difficult to assess by regulator
- Expensive
- Need to been done electronically
- Could be useful in documenting maintenance of continued competency
6. Examinations

• Sound intuitively like a good thing
• Difficult and expensive to make valid and reliable
• Generally poorly designed
• False Positives/ False Negatives
• Blunt instruments that can effect peoples lives and may not protect the public
Examinations

Canadian Experience
10 Provincial Licensing Authorities
21-22 ELIZABETH II

CHAPTER 55

An Act respecting The National Dental Examinining Board of Canada

[Assented to 28th December, 1952]

Whereas The National Dental Examining Board of Canada, hereinafter called “the Board”, has by its petition prayed that it be enacted as hereinafter set forth, and it is expedient to grant the prayer of the petition; Therefore Her Majesty, by and with the advice and consent of the Senate and House of Commons of Canada, enacts as follows:

3. Section 6 of chapter 69 of the statutes of 1902 is repealed and the following substituted therein:

"6. The purposes of the Board shall be
(a) to establish qualifying conditions for a single national standard certificate of qualification for general practitioners dentists;
(b) to establish qualifying conditions for national standard certificates of qualification for dental specialists subject to the approval of The Royal College of Dentists of Canada;
(c) to ensure that the rules and regulations governing examinations will be acceptable to all participating licensing bodies and provide for the conducting of examinations in a manner fair and equitable for all concerned; and
(d) to promote maintenance, with the consent and at the instance of the provincial licensing bodies, of provincial legislation necessary or desirable to supplement the provisions of this Act.”
Act of Parliament

- qualifying conditions (education and examinations) for a national standard of competence for general dental practitioners
- certificate provides portability
- Provincial Boards appoint Board Members
Certification Pathways 1971 - 1993

Graduates of Canadian Schools → Certified

Graduates of all other schools → Written and 3-part Clinical Examination → Certified
NDEB Certification Process

Graduates of Accredited Programs

Written Examination and OSCE

Accredited Qualifying Program

Certified and portable

NDEB Equivalency Process

Graduates of Non-accredited Programs
Certification Pathway

Graduates of Accredited Programs

Written Examination and OSCE

Certified and portable
Written Examination

• 1 day – 300 multiple choice questions
• Clinically applied only
• Questions constructed by educators
• Revised and translated by professional staff
• Questions selected by general dentists appointed by Provincial Boards
OSCE

- 1 Day – 108 extended match or short answer (prescription writing) questions
- Judgment and application only
- Questions constructed and reviewed by educators concentrating on “critical abilities and micro-judgments”
- Questions selected by general dentists appointed by licensing boards
**Question:** (select one or more correct answers.)
There is evidence of caries on the

<table>
<thead>
<tr>
<th></th>
<th>Distal of tooth 2.3</th>
<th>-1</th>
<th>Mesial of tooth 2.4</th>
<th>-1</th>
<th>Distal of tooth 2.6</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Distal of tooth 2.4</td>
<td>+.5</td>
<td>Distal of tooth 2.7</td>
<td>0</td>
<td>Distal of tooth 2.7</td>
</tr>
<tr>
<td>+.5</td>
<td>Distal of tooth 2.5</td>
<td>0</td>
<td>Mesial of tooth 2.8</td>
<td>0</td>
<td>Mesial of tooth 2.8</td>
</tr>
<tr>
<td></td>
<td>Mesial of tooth 2.6</td>
<td>-1</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Question: 1 (select ONE OR MORE correct answers.)

Which of the following modifications is/are required to make the MOD preparation on tooth 4.6 acceptable for an amalgam restoration?

- A. No modifications required.
- B. Deepen the pulpal floor.
- C. Deepen the mesial axial wall.
- D. Deepen the distal axial wall.
- E. Increase the retention and resistance form.
- F. Extend the mesiobuccal wall buccally.
- G. Extend the mesiolingual wall lingually.
- H. Extend the distobuccal wall buccally.
- I. Extend the distolingual wall lingually.
- J. Extend the mesiogingival floor gingivally.
- K. Extend the distogingival floor gingivally.
- L. Remove unsupported enamel in the proximal box(es).
- M. Remove unsupported occlusal enamel.
- N. Finish the cavosurface margin(s).
- O. Remove remaining caries.
Using the case history and photograph 63, answer the following question on the answer score sheet.

<table>
<thead>
<tr>
<th>Patient Information:</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Age: 46</td>
<td>Blood Pressure: 120/80 mmHg</td>
</tr>
<tr>
<td>Gender: Female</td>
<td>Pulse Rate: 72 bpm</td>
</tr>
<tr>
<td>Height: 168cm (5’ 6)</td>
<td>Respiration Rate: 15/min</td>
</tr>
<tr>
<td>Weight: 85kg (187lb)</td>
<td>Temperature: 37°C (98.6°F)</td>
</tr>
</tbody>
</table>

| Chief Complaint: None (routine examination). |

| History of Chief Complaint:              |

| Dental History: No significant findings |

| Medical History:                         |

| Significant Findings: None               |
| Current Medication: Levothyroxine (thyroid hormone) daily |
| Allergies: None                           |

| Social/Family History:                   |

| Significant Findings: Smoker: 1 package/day for 28 years. |

| Clinical Examination:                    |

| Significant Findings:                    |
| Extraoral: None                          |
| Intraoral: See photograph 63. Lesion does not rub off and is localized to the floor of the mouth. Duration unknown. Asymptomatic. |
Question: 2 (Select ONE correct answer)
Which of the following is the most likely diagnosis for the entity shown in Photograph 63?

- A. Linea alba.
- B. Fordyce’s granules.
- C. Leukoedema.
- D. Leukoplakia.
- E. Frictional/traumatic keratosis.
- F. Mucosal burn.
- G. Lichen planus.
- H. Candidiasis.
- I. Hairy leukoplakia.
- J. Lupus erythematosus.
- K. White sponge nevus.
- L. Erythema migrans/geographic tongue.
- M. Mucous patches of secondary syphilis.
- N. Hairy tongue.
Question: 3 (Select ONE OR MORE correct answers.)
On Photograph 92, which component(s) must be opened in order to permit the delivery of oxygen to a patient?

- A
- B
- C
- D
- E
- F
- G

Answer choices: A, B, C, D, E, F, G
Question: 4 (Select ONE OR MORE correct answers.)
The major connector on the removable partial denture framework is

-1  A. positioned in an excessive undercut area.
-1  B. an acceptable distance from the gingival margin.
.5  C. too close to the gingival margin.
-1  D. adequately finished.
.25  E. inadequately finished.
-1  F. too narrow.
.25  G. too wide.
  0  H. impinging on soft tissue.
Written and OSCE

• Passing Standards established with a modified Angoff standard setting procedure

• New versions of the examination are test equated to the standard examination and rescaled to a standardized 75 pass score
Reliability and Validity

• Internal Consistency
  Written - KR 20 = .96
  OSCE - Cronbach’s Alpha = .80
• Validity procedures documented in technical report and published.
Concurrent Validity Study

Subjects: 2300 graduates of Canadian programs

- Demographic data
- Written Examination Results
- OSCE Results
- Performance in final year of dental programs
Percentage of candidates in top, middle and bottom GPA categories scoring within four OSCE score groupings.

<table>
<thead>
<tr>
<th>School GPA</th>
<th>OSCE Score</th>
<th>85+</th>
<th>75-84</th>
<th>65-74</th>
<th>Below 65</th>
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<tbody>
<tr>
<td>Top (30%)</td>
<td></td>
<td>37%</td>
<td>54%</td>
<td>8%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Mid (40%)</td>
<td></td>
<td>23%</td>
<td>57%</td>
<td>20%</td>
<td>0.1%</td>
</tr>
<tr>
<td>Bottom (30%)</td>
<td></td>
<td>10%</td>
<td>53%</td>
<td>34%</td>
<td>3%</td>
</tr>
<tr>
<td>All</td>
<td></td>
<td>24%</td>
<td>55%</td>
<td>20%</td>
<td>1.0%</td>
</tr>
</tbody>
</table>
Certification for graduates of non-accredited programs

Prior to 1999

- Graduates of non-accredited programs
- Written and 3-part Clinical Examination
- Certified and portable
Patient Based Examinations

- Intuitively they look like the way to test dentists
- Dedicated, ethical people work hard to make these exams protect the public
- Examiners feel like the exam is working and protecting the public
- Examiners like experience
Not working

- Candidates with disastrous/dangerous failures would pass the patient based examination the next time
- Anecdotal concerns that candidates who passed were not surviving in practice
- Cost millions of dollars
- Conducted a retrospective study
Retrospective Study

All 1063 candidates who started the NDEB exams after Jan 1, 1996
– Written - 300 MCQ
– Case Based – MCQ, short answer
– Manikin – 8 procedures
– Patient based – 4 restorative procedures
Multiple Choice

- First Time Pass Rate: 65%
- Repeat Pass (2 to 23 times): 14%
- Never Pass: 21%
Case Based

- First Time Pass Rate 53%
- Repeat Pass Rate (2 to 6 times) 25%
- Never Pass 22%
Manikin

- First Time Pass Rate: 48%
- Repeat Pass Rate (2 to 12 times): ~50%
- Never Pass: 18%
Patient Based

- First Time Pass Rate: 69%
- Repeat Pass Rate (2nd/3rd): ~93%
- Never Pass: 3%
1996 -2003 Examinations

Failures due to Patient Based
\[ \frac{11}{1063} = 1\% \]
Although the patient based exam was intended as the most important step in protecting the public, it did not contribute to decision-making.
Patient Based Exams

- Test-retest reliability
  - false positives /false negatives

- Low concurrent validity
  - first time failures do not correlate with other measures
  - results of degree completion programs indicate that there were likely false positives

- There must be uncontrolled variables that are making patient based exams so unreliable that they do not work and do not protect the public
Certification for graduates of non-accredited programs

**Prior to 1999**
- Graduates of non-accredited programs
  - Written and 3-part Clinical Examination
  - Certified and portable

**Starting in 1996**
- Graduates of non-accredited programs
  - Eligibility Examination
  - Accredited Qualifying Program
  - Written Examination & OSCE
  - Certified and portable
Worked really well

- Vast majority of international dentists required full 2 years
- Graduates passed exams and were successful in practice
- Gerrow figures he can start a graduate prosthodontics program and can consult around the world
- Known weakness
Worked really well

Until government decided to get involved
2009 Government Edict

- To all Professions and Trades
- One size fits all not acceptable
- FIX IT NOW or WE WILL
NDEB Equivalency Process for Graduates of Non-accredited Dental Programs
NDEB Equivalency Process

• Online application process
• Credential Verification
• 3 Assessments (4 days)

Successful completion

[Images of Earth, Canada, and New Zealand]
Application & Credential Verification

- Application fee of $1100 paid online by credit card
- Requires documentation verified by NDEB staff, including independent confirmation of graduation directly from the dental school
Assessment of Fundamental Knowledge

- 1 day – 300 multiple choice questions
- $1000 registration fee
- Administered in February and August each year at multiple sites in Canada, the United Kingdom, New Zealand, and Hong Kong
- Admission test for Qualifying/Degree Completion programs
Assessment of Clinical Judgement (ACJ)

- 1 day, 3 booklets (2 case-based and 1 radiology) with extended match match questions
- $1800 registration fee
- Administered in June and December each year immediately before the ACS
Assessment of Clinical Skills (ACS)

- 2 days – 12 requirements performed in a simulated clinical setting (manikins)
- $7000 registration fee
- Administered in June and December of each year at Canadian Faculties of Dentistry and the University of Otago
- Passing standard established using a scoring grid
Assessment of Clinical Skills (ACS)

- Kilgore (Nissin) manikin
- series 200 typodont with layered teeth

1. Amalgam preparation
2. Composite preparation
3. Full metal crown preparation
4. Metal ceramic crown preparation
5. Amalgam restoration
6. Class II composite restoration
7. Class IV composite restoration
8. Endodontic access preparation
9. Provisional crown restoration
10. Rubber dam application
11. Record keeping
12. Infection control
### Equivalency Process Applicants

<table>
<thead>
<tr>
<th>Year</th>
<th>Total</th>
</tr>
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<tbody>
<tr>
<td>2010</td>
<td>1386</td>
</tr>
<tr>
<td>2011</td>
<td>1282</td>
</tr>
<tr>
<td>2012</td>
<td>1224</td>
</tr>
<tr>
<td>2013</td>
<td>1116</td>
</tr>
<tr>
<td>2014</td>
<td>1012</td>
</tr>
<tr>
<td>2015</td>
<td>1086</td>
</tr>
<tr>
<td>2016</td>
<td>1167</td>
</tr>
<tr>
<td>2017*</td>
<td>1086</td>
</tr>
<tr>
<td><strong>Total applicants</strong></td>
<td><strong>9359</strong></td>
</tr>
</tbody>
</table>

* As of July 2017
120 countries

<table>
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<th>Country</th>
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<th>Country</th>
<th>Applicants</th>
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<tbody>
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<td>Korea</td>
<td>195</td>
</tr>
<tr>
<td>Iran</td>
<td>772</td>
<td>UAE</td>
<td>154</td>
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<tr>
<td>Philippines</td>
<td>556</td>
<td>Colombia</td>
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<td>Egypt</td>
<td>578</td>
<td>Brazil</td>
<td>132</td>
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<td>Pakistan</td>
<td>390</td>
<td>Ukraine</td>
<td>110</td>
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<tr>
<td>Iraq</td>
<td>350</td>
<td>Jordan</td>
<td>108</td>
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<tr>
<td>Syria</td>
<td>277</td>
<td>United Kingdom</td>
<td>88</td>
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<tr>
<td>China</td>
<td>194</td>
<td>Russia</td>
<td>82</td>
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</tbody>
</table>

As of February 2017
Reciprocal Agreements

- Currently with US, Australia, New Zealand, and Ireland
- Quebec / France Agreement
<table>
<thead>
<tr>
<th>Stream</th>
<th>Certified Prior to 2010</th>
<th>Certified 2015</th>
<th>Certified 2016</th>
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<tbody>
<tr>
<td>Cdn DDS</td>
<td>450</td>
<td>442</td>
<td>462</td>
</tr>
<tr>
<td>Cdn QP/DCP*</td>
<td>65</td>
<td>83</td>
<td>83</td>
</tr>
<tr>
<td>US/Aus/NZ/Ire</td>
<td>100</td>
<td>241</td>
<td>212</td>
</tr>
<tr>
<td>Equivalency Process</td>
<td></td>
<td>259</td>
<td>251</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>615</strong></td>
<td><strong>1025</strong></td>
<td><strong>1008</strong></td>
</tr>
</tbody>
</table>

* Based on information obtained from Canadian Faculties of Dentistry
Examinations

- Difficult and expensive to make valid and reliable
- False Positives/ False Negatives
- Do not use live patients in one time high stakes examinations
- Oral examinations are also unreliable and should not be used as high stakes examinations
Oversupply?

The Globe and Mail Sept 21 2017

Glut of dentists causes aches in Canada’s big cities

“Current work-force data suggests that there is an oversupply of dentists throughout most regions of Canada, and the current supply of dentists will continue to significantly outpace population growth.”

CDA, 2014
“Valid assessment of professional competence has proven to be an elusive goal. Objective tests, direct observations, overall ratings ... and simulations have all been tried and found wanting in one way or another.”
Measuring Entry Level Competence

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Thank you