



**INDIANA UNIVERSITY**

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SCHOOL OF DENTISTRY

IUPUI

**Indiana University School of Dentistry  
Report to the IUPUI Program Review and Assessment Committee  
Doctor of Dental Surgery  
Advanced and Specialty Programs  
2013**

# Indiana University School of Dentistry DDS and Advanced Education PRAC Report, 2012-2013

## Overview of Programs

The Indiana University School of Dentistry (IUSD) offers a certificate in Dental Assisting, an Associate of Science in Dental Hygiene, a Doctor of Dental Sciences (DDS) and post-graduate Advanced Education and Specialty programs in Periodontics, Pediatric Dentistry, Oral Surgery, Endodontics, Prosthodontics, Orthodontics, Operative Dentistry, Dental Materials and Preventive Dentistry.

This report contains the review of the DDS program, followed by the Advanced Education programs. The Dental Hygiene report is under separate cover. Dental Assisting, as a certificate program, does not complete a PRAC report, but does engage in substantive, competency-based student assessment and is an accredited program.

## Introduction: DDS PROGRAM

Since 1999, dental education in the U.S. has been competency-based. Specific learning outcomes must be demonstrated independently by each student in order for that student to successfully complete the requirements of the degree. Since that time, IUSD has maintained student-level tracking of competencies via its Outcomes Measures documentation. In addition, institutional and program level outcomes assessment, which tracks the progress of the school in achieving the Goals and Objectives as stated in the Mission, Goals, and Vision Statement, <http://www.iusd.iupui.edu/about-us/mission-and-goals/> also takes place annually and is ongoing. During the 2012-2013 Academic Year, two events impacted the assessment and evaluation efforts of the school. In July of 2013, the Commission on Dental Accreditation (CODA) implemented new accreditation standards under which DDS (predoctoral) programs in the United States and Canada are accredited. In September of 2013, **IUSD became the first dental school in the country to be accredited under these new standards.**

Accordingly, the academic years of 2011-2012 and 2012-2013 saw a major effort at the school to engage in self-study. The IUSD Curriculum Assessment Committee (CAC), in conjunction with the Associate Dean of Academic Affairs, the newly appointed Director of Institutional and Program Assessment, and departmental and discipline-based faculty and staff members scrutinized the program from the standpoint of curricular content, course structure and sequencing, assessment tools and mechanisms, and student learning outcomes.

Using information from course syllabi, data from course/module review forms, CoursEval student evaluations, student focus groups, analysis of student performance in courses, clinics, competency examinations, and Board results, a number of program-wide recommendations were identified to improve student learning outcomes, and to strengthen the program in several key areas, including those represented by new accreditation standards.

## **Program-level Assessments, Recommendations and Actions**

Dental accreditation standards mandate that the school have stated goals in the areas of teaching, research, patient care and service. At IUSD, each of the goals in these areas has multiple associated measures which are evaluated regularly and used for continuous improvement. Student outcomes are used as evidence of student learning and as indicators of the quality of aspects of the program from admissions through graduation.

Listed below are three examples of the outcomes measures that are used to evaluate just one of the program goals in the area of Teaching and Learning, along with some of the actions taken based on the data collected.

### **IUSD Teaching and Learning Program Goal:**

Enhance student learning and develop graduates who are highly competent practitioners.

Principle of Graduate and Professional Learning (PGPL) most closely associated with this program goal:

Demonstrate the knowledge and skills needed to meet disciplinary standards of performance.

#### **Example 1:**

##### Program-level Measure of goal:

Students will pass National Dental Board Part I by August prior to the beginning of D4.

##### Findings:

Fall of 2013, 7 students were not successful in their first attempt on the Part I of the NBDE which put them in jeopardy of not meeting the goal.

##### Program Action:

Implement more formal advising/mentoring/study remediation program for students who are not successfully on 1<sup>st</sup> attempt.

##### Program Changes Implemented:

1. Early identification of students having difficulty in basic sciences (D1).
2. D4/D1 mentoring partnerships set up for those students as part of early intervention.
3. More formal system of tracking Board preparation processes.
4. Enforced policies in student handbook regarding Board remediation.
5. A smaller number of faculty (10) assigned to advise all D1 students to facilitate greater interaction with students and continuity in the advising process.
6. Formal proposal to revise school-wide policies on Boards in development by working group.

#### **Example 2:**

##### Program-level Measure of goal:

To graduate > 95% of students within 4 years of enrollment.

##### Findings:

98% of DDS students in class of 2013 completed their program in 4 years

##### Program Action: none needed.

Evaluation of this program objective indicates that IUSD continues to have very strong graduation rates. This is interpreted as evidence for:

1. Sound admissions practices
2. Curriculum that prepares students for success.
3. Effective student support systems.
4. Excellence in teaching and in variety of clinical experiences.

### **Example 3:**

#### Program-level Measure of goal (indirect measure):

IUSD Seniors reporting they feel Prepared, Somewhat Prepared or Well Prepared to treat patient exceeds the mean in comparison with all US DDS graduates (as reported in CODA national survey).

#### Findings:

IUSD seniors met or exceeded national averages in their sense of preparedness for Patient Assessment and Diagnosis, Therapeutics and Prescription Writing; Preventive Practices and Patient Education; Operative; Radiology; Fixed Prosthodontics; Periodontics and Endodontics.

Students felt less prepared than the national student mean in Implants and Practice Management.

#### Program Action:

Both the Implant and Practice Management curricula and faculty have been reviewed and revised or implemented as outlined below.

##### A. Implants

1. Discipline faculty created a scaffolded learning program for implant-related content, which was approved by CAC and implemented.
2. A new student competency measure for Implants was developed and implemented.

##### 2013 Outcomes

44 students completed the implant assists requirement; 55 students successfully completed the restoration of an implant. 97 students were successful on the first competency attempt; 2 were successful after remediation (further discussion with faculty member, and retest).

National level data not yet available to assess impact of this curricular and assessment change on students' perception of preparedness in Implants; student focus groups indicate students felt this improved their exposure, but they would like more opportunity to provide implant restorations.

##### B. Practice Management:

1. New faculty member assumed oversight for this course in 2011.
2. New practice management curriculum implemented 2012.

##### 2013 Outcomes

While still below the national mean, IUSD student assessment of preparedness in Practice Management has improved from 27.1% in 2011 to 57.6 % in 2012. 2013 national data are not yet available.

In addition to the examples above, curricular time for, and assessment of, cultural competence, the application of best evidence-based to patient care and critical thinking was enhanced in 2012-2013. To evaluate these items at the student level, existing competency assessment exam forms were updated. Faculty development sessions were held on evidence-based patient care and faculty, staff and students participated in a humanistic culture survey to assess development needs in this area.

### **STUDENT OUTCOMES, DOCTOR OF DENTAL SURGERY**

All dental education in the U.S. is competency based. Each program is given the latitude to describe the knowledge, skills and attitudes required of the new general dentist and to define the measurements that will be used to assess competency, provided they are in compliance with the Standards for accreditation. IUSD has 20 Competencies that each student must independently challenge and successfully complete to be deemed competent for the beginning practice of general dentistry and to be eligible for graduation.

**The IUSD Competencies, last reviewed and updated in June 2012 by IUSD Faculty Council, are:**

The IUSD graduate must be competent in:

1. patient assessment, diagnosis, and referral
2. treatment planning
3. communicating and collaborating with individuals and groups to prevent oral disease and promote oral and general health in the community
4. control of pain and anxiety, clinical pharmacology, and management of related problems
5. prevention and management of dental and medical emergencies
6. detection, diagnosis, risk assessment, prevention, and management of dental caries
7. diagnosis and restoration of defective teeth to form, function and esthetics
8. replacement of teeth including fixed, removable and dental implant prosthodontic therapies
9. diagnosis and management of periodontal disorders
10. prevention, diagnosis and management of pulpal and periradicular diseases
11. diagnosis and management of oral mucosal and osseous disorders
12. collecting and assessing diagnostic information to plan for and perform uncomplicated oral surgical procedures
13. recognizing and diagnosing malocclusion and space management needs
14. discerning and managing ethical issues and problems in dental practice
15. understanding and application of the appropriate codes, rules, laws and regulations that govern dental practice
16. behavioral patient management and interpersonal skills
17. understanding the fundamental elements of managing a dental practice
18. performing and supervising infection control procedures to prevent transmission of infectious diseases to patients, the dentist, the staff and dental laboratory technicians
19. providing evidence-based patient care in which they access, critically evaluate, and communicate scientific and lay literature, incorporating efficacious procedures with consideration of patient needs and preferences
20. the ability to recognize the role of lifelong learning and self-assessment to maintain competency

Student preparation for and evaluation of competence occurs as an integrated part of all aspects of the predoctoral program. The variety of educational experiences is enhanced by multiple measures of student mastery of knowledge, skills, behaviors and attitudes. Decisions as to the numbers and types of experiences students must have prior to attempting summative written or clinical competency examinations are determined by the disciplines most directly responsible for that content.

Beginning in D1, students are immersed in the Critical Analysis of Clinical Problems a four semester curriculum using patient-based paper cases to foster development toward competence in critical thinking, discerning and managing ethical issues, understanding behavioral patient management and communication skills (Maps to PGPL #1, #2, #3, #4). Students begin the development of clinical skills competence through satisfactory completion of pre-clinical technique courses (Maps to PGPL #1).

Foundations in basic sciences are presented through a systems-based approach using traditional didactic formats (Maps to PGPL #1). Application is enhanced through laboratory experiences and elaborated understanding is developed through application of knowledge gained in lectures and labs during the CTS sessions. D1 and D2 standardized patient OSCE exams formatively and summatively assess problem solving, clinical reasoning, professionalism, ethical decision making and communication skills.

Foundational learning related to biomedical sciences, clinical skills, behavior management and ethical decision making is carried into D3 when students begin the comprehensive care of patients (Maps to PGPL #1, #2, #3, #4). Biomedical and clinical sciences are integrated further through the Applied Patient Treatment (GLA) and Patient Management and Rounds modules, where students are assessed on their understanding of treatment planning and patient management (Maps to PGPL #1, #2, #3, #4). Assessment is primarily through oral and written presentation of patient-based work. D3 students participate in a summative OSCE with a standardized patient living with HIV. Students are assessed on problem solving, clinical reasoning, professionalism, ethical decision-making and communication skills (Maps to PGPL #1, #2, #3, #4).

Formative and summative assessments utilized in the program are summarized in the Table 1.

<b>TABLE 1. Formative and Summative Assessments in Pre-doctoral Dental Education</b>		
<b>Assessment Area</b>	<b>Formative Assessments</b>	<b>Summative Assessments</b>
Clinical Procedures	<ul style="list-style-type: none"> <li>• Applied pt mgmt (GLA) activities</li> <li>• CTS ind and grp activities</li> <li>• Daily comp care clinical grading</li> <li>• Daily rotation clinical grading</li> <li>• Lab examinations</li> <li>• OSCE</li> <li>• Rounds presentations</li> <li>• Written examinations</li> </ul>	<ul style="list-style-type: none"> <li>• Case-based assignments</li> <li>• Clinical competency assessments</li> <li>• Evidence-based literature critique</li> <li>• Lab examinations</li> <li>• OSCE</li> <li>• Written examinations</li> <li>• Written portfolio</li> </ul>
Problem Solving	<ul style="list-style-type: none"> <li>• Applied pt mgmt (GLA) activities</li> <li>• CTS ind and grp activities</li> <li>• CTS process assessments</li> <li>• Daily comp care clinical grading</li> <li>• Daily rotation clinical grading</li> <li>• Lab examinations</li> <li>• OSCE</li> <li>• Reflective writing</li> <li>• Rounds presentations</li> <li>• TJE assessment</li> <li>• Written examinations</li> </ul>	<ul style="list-style-type: none"> <li>• Case-based exams</li> <li>• Clinical competency assessments</li> <li>• CTS process assessments</li> <li>• Triple Jump Exam assessment</li> <li>• Lab examinations</li> <li>• OSCE</li> <li>• Reflective writing</li> <li>• Written Examinations</li> </ul>

**TABLE 1. Formative and Summative Assessments in Pre-doctoral Dental Education**

Assessment Area	Formative Assessments	Summative Assessments
Clinical Reasoning	<ul style="list-style-type: none"> <li>• Applied pt mgmt (GLA) activities</li> <li>• CTS ind and grp activities</li> <li>• CTS process assessments</li> <li>• Daily comp care clinical grading</li> <li>• Daily rotation clinical grading</li> <li>• Lab examinations</li> <li>• OSCE</li> <li>• Reflective writing</li> <li>• Rounds presentations</li> <li>• TJE assessment</li> <li>• Written examinations</li> </ul>	<ul style="list-style-type: none"> <li>• Case-based exams</li> <li>• Clinical competency assessments</li> <li>• CTS process assessments</li> <li>• TJE assessment</li> <li>• Lab examinations</li> <li>• Reflective writing</li> <li>• Written Examinations</li> </ul>
Professionalism	<ul style="list-style-type: none"> <li>• Applied pt mgmt (GLA) activities</li> <li>• Clinical professionalism 360 evals</li> <li>• CTS ind and grp activities</li> <li>• CTS process assessments</li> <li>• Daily comp care clinical grading</li> <li>• Daily rotation clinical grading</li> <li>• Ethical sensitivity assessment</li> <li>• OSCE</li> <li>• Reflective writing</li> <li>• Rounds presentations</li> <li>• TJE assessment</li> <li>• Written examinations</li> </ul>	<ul style="list-style-type: none"> <li>• Case-based exams</li> <li>• Clinical competency assessments</li> <li>• CTS process assessments</li> <li>• OSCE</li> <li>• Reflective writing</li> <li>• TJE assessment</li> <li>• Written examinations</li> </ul>
Ethical Decision-making	<ul style="list-style-type: none"> <li>• Applied pt mgmt (GLA) activities</li> <li>• Clinical professionalism 360 evals</li> <li>• CTS ind and grp activities</li> <li>• CTS process assessments</li> <li>• Daily comp care clinical grading</li> <li>• Daily rotation clinical grading</li> <li>• Ethical sensitivity assessment</li> <li>• OSCE</li> <li>• Reflective writing</li> <li>• Rounds presentations</li> <li>• TJE assessment</li> <li>• Written examinations</li> </ul>	<ul style="list-style-type: none"> <li>• Case-based exams</li> <li>• Clinical competency assessments</li> <li>• CTS process assessments</li> <li>• OSCE</li> <li>• Reflective writing</li> <li>• TJE assessment</li> <li>• Written examinations</li> </ul>

<b>Assessment Area</b>	<b>Formative Assessments</b>	<b>Summative Assessments</b>
Communication Skills	<ul style="list-style-type: none"> <li>• Clinical professionalism 360 evals</li> <li>• CTS process assessments</li> <li>• Daily comp care clinical grading</li> <li>• Daily rotation clinical grading</li> <li>• OSCE</li> <li>• Reflective writing</li> <li>• Rounds presentations</li> <li>• TJE assessments</li> <li>• Written examinations</li> </ul>	<ul style="list-style-type: none"> <li>• Clinical competency assessments</li> <li>• CTS process assessments</li> <li>• Critical incident reports</li> <li>• OSCE</li> <li>• Reflective writing</li> <li>• TJE assessments</li> <li>• Written examinations</li> </ul>

In dentistry, as with many patient-centered disciplines, clinical assessments are highly authentic, in that the “capstone” student experiences are very similar to those required of a practicing dentist, with the exception of the fact that they are performed in a protected environment of a faculty-supervised clinic and that the time allotted for the procedures is somewhat extended. Selections of the summative clinical assessments used to measure student competence are included in Table 2. Each clinical assessment, developed by the related disciplines, is used as a direct measure of at least one IUSD Competency, and most, if not all map to all four of the IUPUI PGPLs.

<b>Clinical Competency</b>	<b>Sequence</b>	<b>Course where taught and/or assessed</b>
Intraoral Radiographic Technique (DXTTR) Competency	D2 Fall	T661 Oral Radiology and Oral Diagnosis
Orthodontic Malocclusion Written Competency	D2 Spring	T643 Orthodontics
Caries Interpretation Competency	D3 Fall	Completion of T661 Oral Radiology and Oral Diagnosis and T662 Radiographic Interpretation
Radiographic Interpretation Competency	D3	In Comprehensive Care Clinic AFTER completion of Radiographic Technique and Caries Interpretation Competencies
Diagnosis and Treatment Planning Competency, Part I	D3 Spring	T750 Diagnosis and Treatment Planning
Caries Management Competency	D3/ D4	T740/T70 or T840/850 Comprehensive Care Clinic



<b>Table 2 IUSD Pre-doctoral Program: Clinical Competency Assessments</b>		
<b>Clinical Competency</b>	<b>Sequence</b>	<b>Course where taught and/or assessed</b>
Complete Denture Competency	D3/ D4	T740/T70 or T840/850 Comprehensive Care Clinic
Fixed Partial Prosthodontics Competency	D3/ D4	T740/T70 or T840/850 Comprehensive Care Clinic
Operative Dentistry Competency	D3/ D4	T740/T70 or T840/850 Comprehensive Care Clinic
Periodontics Clinical Competency	D3/ D4	T740/T70 or T840/850 Comprehensive Care Clinic
Standards Common to All Comprehensive Care Competencies	D3/ D4	T740/T70 or T840/850 Comprehensive Care Clinic
Dental Emergencies Competency	D4 Fall	T820 Advanced Dental Concepts module
Pediatric Dentistry Competencies: -Operative -Space Management -Diagnosis and Treatment Planning -Pulp Therapy -Local Anesthetic	D4 Fall	T840 Pediatric Dentistry Clinic Rotation
Removable Partial Prosthodontic Competency	D4 Fall	T740/T70 or T840/850 Comprehensive Care Clinic
Crown	D4	Implementation: summer 2013 for class of 2014
Diagnosis and Treatment Planning Competency, Part II	D4	T840/T850 Comprehensive Care Clinic
Endodontics Clinical Competency	D4	T840/T850 Comprehensive Care Clinic
Oral and Maxillofacial Surgery Competency	D4	T840/850 Oral Surgery Module
Clinical Implant Module Written Exam	D4 Spring	T840 Implant Module
Fixed Prosthodontics Laboratory Competency	D4 Spring	T840/T850 Comprehensive Care Clinics

<b>Table 2 IUSD Pre-doctoral Program: Clinical Competency Assessments</b>		
<b>Clinical Competency</b>	<b>Sequence</b>	<b>Course where taught and/or assessed</b>
Outcomes of Treatment Competency	D4 Spring	T850 Patient Management and Rounds
Patients with Special Needs Competency	D4 Spring	T830 Advanced Dental Concepts
Health Promotion and Disease Prevention (SEAL Indiana)	D4 Spring	T872 Required Service Learning Section

Based on work begun in 2011-2012, the daily evaluation of patient care by students was revised to a formative feedback model, rather than a summative grade-per-patient model. This change was implemented based on review of grades across several years which indicated grades were routinely very high and the acknowledgment that a numeric or letter grade does not help a student know what they did well or where they need to improve. Based on the literature which indicates that formative assessment in clinical care can be more helpful for a student improvement than a numeric score or grade, a clinical working group prepared assessment criteria for each discipline-based procedure that mirrors the pre-clinical grading criteria students use. Additionally, a self-assessment component, using the same criteria, was added, so that each student now assesses themselves on the procedure before they meet with the faculty member, who then also assesses using the same criteria. The forms have been created in the electronic patient management system and early data indicate that usage of the forms to provide written feedback is improving. D3 and D4 student surveys report they prefer the feedback method of assessment; faculty reports the same, but comment on lack of time to accomplish meaningful feedback. Follow up calibration and training sessions are planned, since after each training session a spike in usage occurs.

Difficult to capture skills and values, including cultural sensitivity, adaptability and communication skills are also assessed at each patient encounter via self and faculty assessment using AxiUm. These attributes are specifically assessed in each Clinical Competency as Competency Evaluation Standards Common to All Disciplines, which includes the evaluation of ethics, patient management and cultural competency, as well as infection control and informed consent. These components ensure that students integrate these critical components into each patient encounter. As part of our self-study, these Common Standards were revised to include cultural competency, which is a new standard in dental education.

Development of professionalism is also emphasized in the assessment scheme of the clinical setting and accounts for a portion of a student's clinical grade each semester. A 360 evaluation is conducted, with peer, self, clinic director and staff evaluations of a student's behavior across broad themes such as empathy, respect, patient-centered care, and knowledge of procedures and materials.

## How are student outcomes assessments used?

Student outcomes for every IUSD Competency are compiled annually and used:

1. By the Institutional Outcomes Assessment Committee to evaluate the effectiveness of the program and curriculum.
2. By the Curriculum and Assessment Committee for ongoing curricular review.
3. By individual Department, Discipline, Course and Module faculty to evaluate curriculum and classroom assessment, competency measures, and content.

## Examples of the results from direct student measures

D1/D2 Written Essays for Ethics and Behavioral Sciences related to the Critical Analysis of Clinical Problems (CTS) cases:

Each year 5-10% of students have essays returned to re-write them after meeting with the module director. For 2013, all D1 and D2 did eventually pass the course.

D1: Triple Jump Examination:

Requires student to critically assess case (orally, with evaluator), identify learning issues, research and master evidence-based literature and present a reasonable oral presentation of the application of the newly obtained information an evaluator. 11 students were initially unsuccessful (of 104) on their first attempt at TJE. Three were still remediating in to the spring, and one completed a successful TJE in the fall of D2.

D1/D2 and D3: OSCE assessments:

In D1 and D2 students participate in Objective Structured Clinical Examinations that include either standardized or simulated patients. Integrated with content assessments, these examinations special needs patients (blind/visually impaired, developmentally disabled, patients living with HIV/AIDS) and include video-taping of the student- patient encounter, self and peer assessment of the encounters in a facilitated feedback session. D1 and D2 OSCEs are primarily formative (students who are scored at or below 75% by the Standardized Patient have their video reviewed by faculty). The D3 OSCE is summative for communication skills.

OSCE Standardized Patient Assessment Outcomes for the Classes 2013-2016					
Class of	Fall D1 First Time Pass Rate (Formative)	Spring D1 First Time Pass Rate (Formative)	Fall D2 First Time Pass Rate (Formative)	Spring D2 First Time Pass Rate (Summative)	Fall D3 First Time Pass Rate (Summative)
2013	85.4% (88/103)	92.1% (95/103)	98.9% (97/98)	88.9% (88/99)	97.9% (97/99)
2014	91.0% (91/100)	93.2% (96/103)	88.5% (92/104)	99.0% (103/104)	100% (103/103)
2015	83.7% (87/104)	94.2% (97/103)	87.5% (91/104)	94.2% (98/104)	**
2016	88.3% (91/103)	92.2% (95/103)	**	**	**
Mean Pass Rate	87.0% (357/410)	93.2% (480/515)	90.1% (368/408)	94.3% (487/516)	98.7% (404/409)

Program changes based on the self-study, student focus group reports (highly positive for OSCE), and student outcomes on OSCE examinations have led to the development and implementation of an ethics component in all three years of OSCE testing.

### **Operative Competency**

The Operative Competency Exam is an excellent example of an assessment instrument utilized to measure student proficiency in direct restorations of teeth. In order to attempt the Competency, students must have completed between 40 and 60 direct restorations on patients. They are then allowed to begin the five restorations (on various patients) that will be used to evaluate their clinical competence in this area. For the Class of 2013, the outcomes were: 96 students 1<sup>st</sup> attempt pass (all five “test” restorations met the criteria sufficiently to be acceptable); 3 students were successful on their 2<sup>nd</sup> (had to attempt five restorations a second time). Review of the operative competency outcomes and the measurement instrument indicates that preclinical and clinical experiences are preparing students well prepared to become competent and that the instrument is well suited to the competency. Further, student success rates on the Clinical Boards Examinations indicate that students are well-prepared for the direct restoration components of the Clinical Licensing Examinations for which they sit. (100% pass rate by second attempt for all IUSD students on the North East Regional Board).

### **Outcomes of Treatment Competency**

An example of a capstone-type competency assessment in dentistry that incorporates the Common Standards with discipline skills is the Outcomes of Treatment Competency. For this competency, students present to their clinic director and peers a patient for whom they have completed substantial patient care. Based on a review of the previous student presentations, the competency was revised in 2013 by the Clinic Directors to include a more direct assessment of student use of best evidence in patient care, and of the integration of biomedical and behavioral considerations. The new format has been implemented in the Clinical Rounds setting and is required for students graduating in the class of 2014.

Additional Competency Assessments were developed during 2012-2013, including a Crown Clinical Competency and the previously mentioned Implant Competency. The Crown competency was implemented for the class of 2014.

### **Summary**

Developing highly competent practitioners is a stated goal of the school, and the IUSD Institutional Competencies define what a competent graduate will be able to do upon graduation. Multiple assessments are used to evaluate students across four years of the program and include the assessment of broad range of attributes. Competency Assessment Exams serve as the final measurement of the defined set of knowledge, values and skills that have been developed through the formative daily feedback process.

The School has multiple processes in place to evaluate the content of the program, the measurement instruments used in student evaluation and the outcomes of those assessments to ensure that there is meaningful, ongoing outcomes assessment.

## **Advanced and Specialty Programs Report**

## Advanced and Specialty Programs

The Indiana University School of Dentistry offers the Masters of Science in Dentistry degrees (MSD) Operative Dentistry, Prosthodontics, Endodontics, Periodontics, Pediatric Dentistry, Preventive Dentistry and Orthodontics. A 4-year residency program is also available in Oral and Maxillofacial Surgery. The MSD requires that a student already has a DDS or DMD. Students may also enroll in the university's graduate school for a MS in dental materials or preventive dentistry or for a PhD. in dental science, preventive dentistry, oral biology or dental biomaterials. These programs do not necessarily require a previous dental degree. Of the programs available, the Commission on Dental Accreditation (CODA) accredits Pediatric Dentistry, Prosthodontics, Endodontics, Periodontics, Oral and Maxillofacial Surgery and Orthodontics; these programs participated in the CODA site visit in September, 2013. The non-CODA accredited post-graduate programs participated in a program review process with the IUPUI campus in 2012-13.

In the first year of their program, all Advanced and Specialty students in each graduate program participate in a core of common Graduate Specialty courses which include two Oral Pathology courses, Biostatistics, Advanced Radiology and Oral Biology. In each program, students must demonstrate mastery of these basic and dental sciences through their performance on written and oral examinations. Students must maintain a minimum grade point average of 3.0 and demonstrate evidence of continuing professional growth (as defined by the program) to remain in good standing.

Beyond those core courses, the content and clinical activities of each advanced program are very discipline specific and as such, they are briefly outlined below with *examples* of the program student learning objectives, mapped to the Principles or Graduate and Professional Learning (PGPL), along with the assessment mechanisms and findings, program actions and improvements.

Only the CODA accredited clinical specialties are included in this report.

PLEASE NOTE: The items included for the advanced programs are representative rather than exhaustive.



**Name of Advanced or Specialty Program: ENDODONTICS**

The dental specialty of Endodontics requires an additional 24 months of clinical and didactic training. Admission to the program is competitive, and successful applicants must have maintained a minimum of 3.0/4.0 grade point in their dental education program and have graduated in the upper third of their class. For 2013, 51 students applied to the program, two students were selected.

As with most advanced patient care programs, the stated student outcomes incorporate aspects of knowledge in the specialty with the clinical care of patients. By definition, the standard of care for patients includes the ethical practice of one's discipline.

**Selected student learning objectives for Endodontics**

Graduates will be able to:

1. demonstrate proficiency in the basic sciences and endodontic-related didactic courses.
2. increase the knowledge base of endodontics through research, publications and presentations.
3. critically evaluate endodontics with the appropriate literature.

**Alignment with the Principles of Graduate and Professional Learning**

The student objectives listed above align with the PGPLs and examples of how each principle might be conceptualized within the program are provided here.

**PGPL #1** *Demonstrate the knowledge and skills needed to meet disciplinary standards of performance.*

Students demonstrate the mastery of the knowledge and skills in endodontics during written and oral assessments within the program, demonstrate the integration and application of the knowledge and skills in daily patient care, and by successfully challenging the written, oral and patient-based examinations to become Board certified.

**PGPL #2** *Communicate effectively with peers, clientele and the general public.*

Complex treatment plans require the ability to communicate with patients to determine their wants and needs, as well as the ability to share the expert's knowledge in a manner that is clear to the patient so that the patient is able to make an informed decision about their care. Treatment planning evaluations, faculty observation during patient care, oral defense of content knowledge and communication with peers via posters or presentations all demonstrate successful attainment of this PGL.

**PGPL#3** *Think critically and creatively to improve practice in the field.*

In addition to the care of patients, each endodontics resident must conduct original research that must be presented as either a thesis or as an article suitable for publication in a discipline journal.

**PGPL#4.** *Meet all ethical standards established for the discipline.*

The daily treatment of patients, including the safeguarding of protected health information and obtaining informed consent are evaluated with every patient. In addition, students engaged in research participate in the IRB process as outlined by the university.



Student assessment methods/measures of student learning related to the first student learning outcome objective is provided here as an **EXAMPLE** of the assessment process across the 2 year program. Each objective has multiple measures associated with the measure, similar to this example.

Objective	Assessment Mechanism	Results Achieved
Graduates will be able to demonstrate proficiency in the basic sciences and endodontic-related courses.	Written and oral assessments in the basic sciences and endodontic-related didactic courses.	All residents have received a letter grade of B or greater and Pass in P/NP in didactic and clinical courses.
	Clinical proficiency performances including quality of root-canal procedures.	All residents receive a letter grade of B or better on clinical cases.
	Oral rationale of differential diagnosis (developed and presented for every patient)	Formative discussion with supervising specialist.
	Oral Case Defense	All residents successfully completed oral case defenses.
	American Board of Endodontics Exam	Twenty-four graduates have passed Part I of the Board; and five have passed Part II in the past seven years with five graduates becoming certified as Diplomates within that time (passed Part III).

The program director meets with each student every 6 weeks for case reviews and ABE preparation and case selection, which allows for additional opportunities to assess and discuss grades, cases, professional progress, etc.

**Name of Advanced or Specialty Program: PERIODONTICS**

The dental specialty of Periodontics requires an additional 36 months of clinical and didactic training. Admission to the program is competitive, and successful applicants must have maintained a minimum of 3.0/4.0 grade point in their dental education program and have graduated in the upper third of their class; the maximum number of students enrolled in all three years of the program cannot exceed 15. In 2013, 3 students were accepted.

As with most advanced patient care programs, the stated student outcomes incorporate many of the aspects of knowledge in the specialty with the clinical care of patients. By definition, the standard of care for patients includes the ethical practice of one's discipline.

**Selected student learning objectives for Periodontics**

Graduates will be able to:

1. demonstrate they have acquired the scientific knowledge, diagnostic and therapeutic skills involved in clinical periodontics and implant dentistry.
2. critically evaluate the dental literature, research and new therapeutic techniques.
3. diagnose and effectively treat periodontal disease and edentulism with dental implants.
4. identify and integrate systemic and/or other oral conditions in establishing and maintaining periodontal health.
5. advance the understanding of the theory and methods of clinical and basic science research.
6. communicate knowledge of periodontics, oral medicine and related subjects to patients and in an academic environment.
7. demonstrate an understanding of the theory and methods of performing research.

**Alignment with the Principles of Graduate and Professional Learning**

The student objectives listed above align with the PGPLs and examples of how each principle might be conceptualized within the program are provided here.

**PGPL #1** *Demonstrate the knowledge and skills needed to meet disciplinary standards of performance.* Students demonstrate the mastery of the knowledge and skills in periodontics during written and oral assessments within the program, demonstrate the integration and application of the knowledge and skills in daily patient care, and by successfully challenging the written, oral and patient-based examinations to become Board certified.

**PGPL #2** *Communicate effectively with peers, clientele and the general public.*

Complex treatment plans require the ability to communicate with patients to determine their wants and needs, as well as the ability to share the expert's knowledge in a manner that is clear to the patient so that the patient is able to make an informed decision about their care. Treatment planning evaluations, faculty observation during patient care, oral defense of content knowledge and communication with peers via posters or presentations all demonstrate successful attainment of this PGL.

**PGPL#3** *Think critically and creatively to improve practice in the field.*

In addition to the care of patients, each periodontics resident must conduct original research that must be presented as either a thesis or as an article suitable for publication in a discipline journal.

**PGPL#4.** *Meet all ethical standards established for the discipline.*

The daily treatment of patients, including the safeguarding of protected health information and obtaining informed consent are evaluated with every patient. In addition, students engaged in research participate in the IRB process as outlined by the university.

Student assessment methods/measures of student learning related to the first student learning outcome objective is provided here as an **EXAMPLE** of the assessment process across the 3 year program. Each objective has multiple measures associated with the measure, similar to this example.

Desired student outcome	Assessment mechanisms/Measures	Findings
Graduates will demonstrate attainment of scientific knowledge and the acquisition of diagnostic and therapeutic skills involved in clinical periodontics and implant dentistry.	Proficiency in basic science and periodontal-related didactic courses as measured by written and oral examinations in didactic and clinical courses.	All residents have received a letter grade of B or greater and Pass in P/NP in didactic and clinical courses.
	AAP In-Service Exam (ISE)	Since 2006, 14/24 graduate students have achieved a fiftieth percentile score or higher on at least one of the three ISEs. Students failing to test at least at the 50th percentile ISE were remediated by retesting on every question answered incorrectly. (Minimal passing score for remediation testing was 80%, all remediated students scored above 90%. )
	American Board of Periodontology Qualifying and Oral Exams	Since 2006, 25/27 of the graduated students have passed the ABP Qualifying Exam. As of April 2013, 24/29 graduates have passed the ABP Oral Exam.
	Faculty performance evaluations in Advanced Periodontal Treatment Planning Seminars	All students have received a mean score of 3 (passing) or better on faculty evaluations
	Case Defense examinations	Since 2006, students have received a score of 70 or better on each of the 3 case defense examinations given during the three year program.
	MSD Qualifying Oral & Written Examinations	24/24 of the most recent graduate students have successfully passed the MSD Qualifying Oral & Written Examinations. 4/24 required some remediation in certain areas before successful completion.

During the 12-13 academic year, as a part of the self-study process, the Periodontics faculty implemented a student self-assessment component and revised some formal proficiency examinations to better reflect intended outcomes.

**Name of Advanced or Specialty Program:    PROSTHODONTICS**

The dental specialty of Prosthodontics requires an additional 36 months of clinical and didactic training. Admission to the program is competitive, and successful applicants must have maintained a minimum of 3.0/4.0 grade point in their dental education program and have graduated in the upper third of their class; 6 students are accepted each year from more than 80 applicants.

As with most advanced patient care programs, the stated student outcomes incorporate many of the aspects of knowledge in the specialty with the clinical care of patients. By definition, the standard of care for patients includes the ethical practice of one's discipline.

**Selected student learning objectives for Prosthodontics**

Graduates will be able to:

1. demonstrate they have scientific knowledge and acquired diagnostic and therapeutic skills involved in clinical prosthodontics, maxillofacial prosthetics and implant dentistry.
2. apply this knowledge and these skills effectively to the diagnosis and treatment involved in clinical prosthodontics, maxillofacial prosthetics and implant dentistry.
3. communicate knowledge of prosthodontics, dental implants and related subjects to their patients and in an academic environment.
4. critically evaluate the dental literature, research and new treatment techniques.
5. demonstrate an understanding of the theory and methods of performing research.

**Alignment with the Principles of Graduate and Professional Learning**

The student objectives listed above align with the PGPLs and examples of how each principle might be conceptualized within the program are provided here.

***PGPL #1 Demonstrate the knowledge and skills needed to meet disciplinary standards of performance.***

Students demonstrate the mastery of the knowledge and skills in prosthodontics during written and oral assessments within the program, demonstrate the integration and application of the knowledge and skills in daily patient care, and by successfully challenging the written, oral and patient-based examinations to become Board certified.

***PGPL #2 Communicate effectively with peers, clientele and the general public.***

Complex treatment plans require the ability to communicate with patients to determine their wants and needs, as well as the ability to share the expert's knowledge in a manner that is clear to the patient so that the patient is able to make an informed decision about their care. Treatment planning evaluations, faculty observation during patient care, oral defense of content knowledge and communication with peers via posters or presentations all demonstrate successful attainment of this PGL.

***PGPL#3 Think critically and creatively to improve practice in the field.***

Patients who seek the care of a prosthodontist generally have complex needs that go beyond the scope of the general dentist. The ability to devise novel applications of prosthetics is one example of students demonstrating their ability to improve practice in the field via critical evaluation and creative thinking.

***PGPL#4. Meet all ethical standards established for the discipline.***

The daily treatment of patients, including the safeguarding of protected health information and obtaining informed consent are evaluated with every patient. In addition, students engaged in research participate in the IRB process as outlined by the university.

Student assessment methods/measures of student learning related to the first student learning outcome objective is provided here as an **EXAMPLE** of the assessment process across the 3 year program. Each objective has multiple measures associated with the measure, similar to this example.

Desired Student Outcome	Assessment mechanisms/Measures	Findings
Demonstrates mastery of basic science, prosthodontics and maxillofacial prosthetic clinical sciences knowledge.	Written and oral examinations in didactic and clinical courses, including clinical proficiency exams.	All students have performed at or above a 3.0/4.0 in didactic and clinical courses.
	Faculty performance evaluations in various Treatment Planning Seminars & Prosthodontic Patient Presentation Seminar	All students have received a mean score of 3 (passing) or better on faculty evaluations
	Performance on American College of Prosthodontics Mock Board Examination	Over the past five years, 22/29 graduate students have either increased or maintained their scores on the ACP Mock Board Examination.
	Performance in MSD Qualifying Oral & Written Examinations	<p>Since the last accreditation site visit, 32/32 graduate students have successfully passed the MSD Qualifying Oral &amp; Written Examinations.</p> <p>3/32 required some remediation in certain areas before successful completion.</p>
	Pass/Non Pass rate on American Board of Prosthodontics Examinations	<p>13 of 32 graduates since 2006 have challenged the written portion of the American Board of Prosthodontics. 12 of those were successful.</p> <p>2 have successfully completed all portions of the Board and are now diplomats, the highest level of credentialing in the discipline.</p>

During the 12-13 academic year, the Prosthodontics faculty conducted a self-study in preparation for the Sept 2013 site visit. Recent program revisions include the addition of two seminars and one literature review (a didactic, resident-led multidisciplinary seminar on dental implantology).

**Name of Advanced or Specialty Program: Oral Surgery**

The dental specialty of Oral and Maxillofacial Surgery requires an additional 48 months of clinical and didactic training. Admission to the program is competitive, and successful applicants must have maintained a minimum of 3.0/4.0 grade point in their dental education program and have graduated in the upper third of their class; 3 students are accepted each year from more than 130 applicants.

As with most advanced patient care programs, the stated student outcomes incorporate many of the aspects of knowledge in the specialty with the clinical care of patients. By definition, the standard of care for patients includes the ethical practice of one's discipline.

**Selected objectives for Oral and Maxillofacial Surgery**

Graduates will be able to:

1. demonstrate proficiency in the full range of procedures, treatments, surgical and anesthetic techniques available to oral and maxillofacial surgeons.
2. demonstrate familiarity with and understanding of the relevant literature.
3. participate in scholarly activity which includes a scientific research project, and/or writing a paper suitable for publication prior to graduation and/or presenting at a local, regional or national meeting.

**Alignment with the Principles of Graduate and Professional Learning**

The student objectives listed above align with the PGPLs and examples of how each principle might be conceptualized within the program are provided here.

**PGPL #1** *Demonstrate the knowledge and skills needed to meet disciplinary standards of performance.*  
Please see the table on the following page.

**PGPL #2** *Communicate effectively with peers, clientele and the general public.*  
Please see the table on the following page.

**PGPL#4.** *Meet all ethical standards established for the discipline.*

The daily treatment of patients, including the safeguarding of protected health information and obtaining informed consent are evaluated with every patient. In addition, students engaged in research participate in the IRB process as outlined by the university.

The table following summarizes student assessment mechanisms related to a single program objective and is used only as an example. The source of the information is the 2013 IUSD Oral and Maxillofacial Self-Study prepared for the Commission on Dental Accreditation.

<b>ORAL AND MAXILLOFACIAL SURGERY</b>			
<b>Example Objective 1 (of 5)</b>			
<b>Objective</b>	<b>Assessment Mechanism</b>	<b>Findings (# matches Assessment Mechanism)</b>	<b>Program Improvement &amp; Action Steps</b>
<p>Residents will demonstrate proficiency in the full range of procedures, treatments and surgical and anesthetic techniques available to oral and maxillofacial surgeons</p> <p><b>PGL: #1</b> <i>Demonstrate the knowledge and skills needed to meet disciplinary standards of performance.</i></p> <p><b>PGL: #2</b> <i>Communicate effectively with peers, clientele and the general public.</i></p>	<ol style="list-style-type: none"> <li>1. Operating Room log</li> <li>2. Outpatient treatment records (Axium)</li> <li>3. Sedation log (anesthetic records)</li> <li>4. Resident evaluations (on-service and off-service)</li> <li>5. One on one observation by faculty</li> <li>6. Oral and Maxillofacial Surgery In-Service Training Examination (OMSITE)</li> <li>7. American Board of Maxillofacial Surgery Qualifying and Certifying Exams</li> </ol>	<p>#1 &amp; 2. Logs and treatment records reveal some clinical experiences in facial esthetics, such as Botox, and limited arthroscopic TMD surgery</p> <p>Residents need more experience in esthetic, and arthroscopic surgery.</p> <p>6. OMSITE results – progressive improvement for the last 8 years, all residents have taken the qualifying examination and the oral certifying examination. All residents have been successful.</p> <p>7. All recent residents have achieved ABOMS diplomate status.</p>	<p>1. Program developed for esthetic assessment has increased student opportunity for experience in esthetics.</p> <p>1 &amp; 2. There is the potential for arthroscopic surgery exposure to increase as a dental school faculty member has received training in the nonsurgical management of the TMD patient has recently established practice to support this patient population.</p> <p>6. As a measure of resident progress, the continuously improving OMSITE results indicates improving student learning.</p>

**Name of Advanced or Specialty Program: Pediatric Dentistry**

The dental specialty of Pediatric Dentistry requires an additional 24 months of clinical and didactic training. Admission to the program is competitive, and successful applicants must have maintained a minimum of 3.0/4.0 grade point in their dental education program and have graduated in the upper third of their class. In 2013, 96 applicants competed for 6 openings.

The objectives affirmed in the 2012-2013 Pediatric Dentistry self-study are stated from the perspective of benchmarks for the graduates of the program rather than on competency-type assessments as seen in predoctoral education. It is acknowledged that this does not fit perfectly with the requested model of program assessment at IUPUI, but is none-the-less the way the outcomes measures are constructed for this program based in Riley Children's Hospital, and the information is taken directly from the program's self-study.

**Selected example outcome objectives for Pediatric Dentistry include:**

**Outcome Objective # 1.**

**All Pediatric Dentistry Graduate Students will follow the Indiana University School of Dentistry Graduate Student Manual Policy on student progress, including grades and requirements for graduation.**

Related Graduate PUL: *Demonstrate the knowledge and skills needed to meet disciplinary standards of performance.*

Assessment Mechanism: Gradepoint average in graduate courses, as determined by written and clinical assessments.

Findings: All residents in the last five years have successfully maintained the required 3.0/4.0.

**Outcome objective #2.**

**All graduate students will pass their oral and written qualifying exams prior to entering their second year of residency.**

Related Graduate PUL: *Demonstrate the knowledge and skills needed to meet disciplinary standards of performance.*

Assessment Mechanism: Oral and Written Qualifying exams.

Findings: For the last five years, all students have passed their examinations.

Based on the Commission on Dental Accreditation Standards for Pediatric Dentistry Advanced Education programs, there were no recommendations for the program to revise its student or program outcomes measures.



**Name of Advanced or Specialty Program: Orthodontics**

The dental specialty of Pediatric Dentistry requires an additional 24 months of clinical and didactic training. Admission to the program is competitive, and successful applicants must have maintained a minimum of 3.0/4.0 grade point in their dental education program and have graduated in the upper third of their class. In 2013, 150 applicants competed for 7 positions.

**Selected student learning outcomes for Orthodontics include:**

Graduates will be able to

1. provide the best possible orthodontic treatment for patients.
2. utilize a scientific background to make competent treatment decisions and to assess the quality of orthodontic treatment they provide.
3. Contribute significantly to the health of the community through meeting their social and professional responsibilities.
4. Contribute to the advancement of orthodontics through basic, applied and educational research and the dissemination of those findings.

**Examples** of student objectives, assessment mechanisms and use of information for program improvement are listed below.

<b>Obj. #1 Provide the best possible orthodontic treatment for patients.*</b> <b>Obj. #2 Utilize a scientific background to make competent treatment decisions and to assess the quality of orthodontic treatment they provide.</b>					
Related IUPUI PG&PL**	Assessment Mechanisms	Intent of assessment	When assessed	Program Improvement & Action Steps	Results Achieved
<b>#1. Demonstrate the knowledge and skills needed to meet disciplinary standards of performance.</b>  <b>#2. Communicate effectively with peers, clientele and the general public.</b>	1. Course grades in Core Master's Classes (5 courses) via written and laboratory examination (minimum of 70% to pass).	Measure knowledge in disciplinary and cross disciplinary content.	Ongoing in first year of specialty program.	No changes for 2011-2012.  In past 4 years 2 students in combined Phd./Ortho or Perio/Ortho joint degree failed Ortho courses.	All ortho residents successfully completed Core classes.  Suspended joint degree program.
	2. Weekly Grand Rounds Case Conferences (graded course; minimum of 70% to pass).	Assess clinical knowledge application to patient care.	Weekly feedback; course grade by semester.		2012 all students passed

<p><b>#3. Think critically and creatively to improve practice in the field.</b></p> <p><b>#4. Meet all ethical standards established for the discipline.</b></p>	<p>3. Qualifying Exam (end of year 1); both written and oral. Each section must be independently passed at a minimum of 70% and each question by at least 40%.</p>	<p>Assess discipline knowledge, problem solving as it relates to patient cases, and ability to communicate treatment plans.</p>	<p>May/June of first year</p>	<p>Ongoing evaluation of exam content &amp; student outcomes in summer.</p>	<p>One student in 2012 identified with significant deficits offered opportunity to repeat the year</p>
<p>**Due to the integrated and authentic nature of most assessments in clinical patient care, which require both content knowledge and skills, the ability to communicate with patients and faculty in order to explain and gain compliance, and the necessity to provide patient care that is compliant with the ethical and legal standards of care, all of the Principles of Learning in Professional Education are represented in most of the Orthodontics Program objectives.</p>	<p>4. Evaluate 40 completed cases using ABO format (System allows quantification of patient outcomes related to measures of quality in final orthodontic treatment results)</p>	<p>Assess quality of care provided to patients over length of treatment; demonstrate provider's ability to assess the outcomes of care. Utilization of ABO format improves calibration of assessment.</p>	<p>Ongoing throughout program.</p>	<p>Review of reduced numbers of cases completed led to changes in patient assignments, evaluation of faculty assignments and how duration of treatment to improve student access to diverse and complex patients.</p>	<p>Numbers of screenings, records and new patient starts increased in AY 2011-2012 as evidenced by Clinical Production reports, which should translate to increased access to a variety of patients for student learning opportunities.</p>
	<p>5. Complete the Phase II American Board of Orthodontics Exam</p>	<p>A capstone measure of the student's successful mastery of the principles and practice of Orthodontics.</p>	<p>At the end of the second year of residency.</p>	<p>The high pass rate on this national competency exam indicates that the students are mastering the knowledge and skills expected for the field.</p>	<p>Since 2008, all residents except 1 have passed this Exam. The one student passed the examination on the second attempt.</p>

**The Orthodontic Postgraduate Program at Indiana University School of Dentistry trains ethical and competent orthodontists who:**

**Obj. #3 Contribute significantly to the health of the community through meeting their social and professional responsibilities.**

Related IUPUI PG&PLs	Assessment Mechanisms	Intent of assessment	When assessed	Program Improvement & Action Steps	Results Achieved
<p><b>#1. Demonstrate the knowledge and skills needed to meet <u>disciplinary standards of performance</u>.</b></p> <p><b>#2. Communicate effectively with peers, clientele and the general public.</b></p> <p><b>#4. Meet all ethical standards established for the discipline.</b></p>	<p>In addition to the applicable assessments listed above, students have practice management evaluations that include the assessment of their treatment of patients who have:</p> <ul style="list-style-type: none"> <li>a. craniofacial anomalies;</li> <li>b. biopsychosocial complications to orthodontic care</li> </ul> <p>Post graduate survey of participation in organized dentistry, community activities, provision of free or reduced cost treatment to patients of need, and treatment of children with special needs or craniofacial anomalies.</p>	<p>To evaluate the thoroughness and quality of care provided to all patients, including those with special needs.</p> <p>To determine the degree to which students are meeting social and professional responsibility as practitioners.</p>	<p>At least twice per year.</p> <p>1-5 years post graduate</p>	<p>Evaluation of patient case complexity, number of patient cases started, number of patient cases transferred, number of patient cases completed.</p>	<p>Continue emphasis on care for those with special needs and craniofacial anomalies.</p> <p>70% of responding graduates involved in community activities, 23% on a weekly basis. 96% provide free or reduced cost treatment for some patients. 60% see patients with special needs or craniofacial anomalies</p>