

ABSTRACT: 2017 ELAM Institutional Action Project Symposium

Project Title: Impact of the U.S. Oral Sciences Ph.D. Programs on Dental School Faculty Workforce: Analyses of Aggregate Program Enrollment, Graduates, and Placement Data

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Background, Significance of project: Among the 66 dental schools in the U.S., there are 27 schools offering Ph.D. training in Oral or Biomedical Sciences. American Dental Association (ADA) surveys these Ph.D. program annual enrollments and graduation. However, there's no aggregate data on trends of enrollment and placement of these program graduates. These Ph.D. program graduates are presumed to be the prime candidates for dental school faculty positions. However, there's no evidence to validate or disapprove such assumption. Lack of such evidence has made it difficult for the dental schools to gauge whether Ph.D. programs are training adequate number of students to support the education and research mission of the dental profession.

Purpose/ Objectives: Purpose of this project was to collect and analyze data on Ph.D. student enrollment, graduation, and placement among the U.S. dental schools from 1994 to 2016. The objective was to understand whether the oral sciences PhD programs were consistently enrolling students and whether any of those Ph.D. students upon completion of their training entered the dental faculty workforce.

Methods/Approach: The study approach was to collect Ph.D. program enrollment and graduation data from ADA annual survey between 1994 and 2016. The data extracted from ADA surveys allowed analyses of the annual enrollment and graduation. In addition, a survey aiming at collecting Ph.D. program graduate demographics and placement data was designed and constructed. Twenty-seven Ph.D. program directors were invited to participate. Three of those 27 Ph.D. programs enrolled students within the study timeframe but are currently inactive. Follow up phone calls and emails at monthly intervals continued from December 2016 to March 2017 to encourage participation.

Outcomes and Evaluation Strategy: Although the number of dental schools in the U.S. has increased, the number of oral sciences Ph.D. program remained the same from 1994 to 2016. In recent years, among the 65 to 66 dental schools, there were only 16 programs enrolling Ph.D. students consistently. On an average, 34 students were enrolled per year into either the D.D.S./Ph.D. or Ph.D. program during the study period. However, there was a significant decrease of enrollment in 2010-2011, which persisted and resulted in an average enrollment of only 21 students per year among all programs in recent years. For the oral sciences Ph.D. program director survey, we targeted a minimum of 80% response rate. To date, we have 20 completed surveys or 74% participation. We continue to work with program directors hoping to increase participation. When survey results are compiled, we will analyze and determine program student demographics, enrollment, attrition, and placement.

Conclusion with Statement of impact/potential impact: Our ultimate goal is to demonstrate the collective activities of oral sciences Ph.D. programs in the U.S. With this pilot study outcomes, we hope to engage all the oral sciences Ph.D. programs and the American Dental Education Association to devote effort toward collecting and making available the vital stats, specifically enrollment, graduation, and placement of the oral sciences Ph.D. programs in the U.S. on annual basis and assess its impact on dental faculty workforce.

Impact of the U.S. Oral Sciences PhD Programs on Dental School Faculty Workforce: Analyses of Aggregate Program Enrollment, Graduates, and Placement Data

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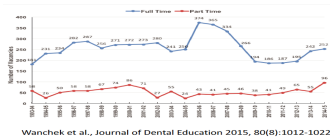
BACKGROUND

The 2014 American Dental Education Association (ADEA) Survey of Vacant Budgeted Faculty Positions revealed a prolonged faculty shortage over the past two decades (Wanckek et al., 2016). There continued to be a need for more faculty to support education and research mission in Dentistry. Among the 66 dental schools in the U.S. there were 27 schools offering PhD training in Oral or Biomedical Sciences. American Dental Association (ADA) surveys these PhD program enrollments and graduation annually. However, there's no specific data on trends of enrollment of these PhD students, when graduated, are presumed to be the prime candidates for dental school faculty positions. However, there's no evidence to validate or disprove such assumption. Lack of such evidence has made it difficult for the dental schools to gauge whether PhD programs are training adequate number of students to support the education and research mission of the profession.

INTRODUCTION

To achieve the education, patient care, and research mission of a dental school, well-qualified dental faculty members are essential. Yet, as the U.S. economy sustains its vigor, attracting dental graduates to academia is extremely challenging. The U.S. dental schools have endured two decades of significant faculty shortage and the relief is not yet in sight.

Dental Faculty Workforce (1994-2015)



The primary sources of new faculty, age 30 to 39, included private practice (32.8%), advanced dental education (25.2%), and faculty positions at other schools (15.6%). Men were more likely (57.9%) than women (46.8%) to enter academia from the private practice. While women faculty are more likely to come from advanced degree program (19.2%) than male faculty (9.8%). Recruiting students in graduate studies to enter academia has been a consistent approach. Maintaining rigorous graduate programs is a potential strategy to grow pipeline of dental faculty. Although the American Dental Association surveys enrollment and graduation of advanced dental education programs on annual basis, there exists no aggregate data to allow a confident projection of trends.

Purpose of this study was to collect and analyze available data on PhD student enrollment, graduation, and placement of the U.S. dental schools from 1994 to 2016. The objective was to examine available data to understand whether the oral sciences PhD programs in dentistry were consistently enrolling students and whether any of those PhD students upon completion of their training entered the dental faculty workforce.

METHODS & RESULTS

The study was reviewed and exempted by the Institutional Review Board of the University of Michigan. Our approach was to collect relevant PhD program enrollment and graduation data from ADA annual survey of advanced dental education between year 1994 and 2016. The data extracted from ADA surveys was compiled into Excel spreadsheets allowing calculation and analysis of the annual new enrollment and graduation. A survey to obtain PhD program student and graduate demographics and placement data was constructed. Twenty-seven PhD program directors were contacted first through an email to provide study documents then immediately via phone calls to invite their participation and to answer their questions about the survey. Three of those 27 PhD programs enrolled students within the study timeframe but are currently inactive. Follow up phone calls and emails at monthly intervals continued from December 2016 to March 2017 to encourage participations.

Because of the oral sciences PhD programs differ significantly in type of degree offered, years in operation, number of students enrolled, etc., we targeted 80% response rate. The assumption was that data collected from 22 out of 27 programs would provide representative information. We have 21 completed surveys to date and continue to work with the remaining program directors to gain participation.

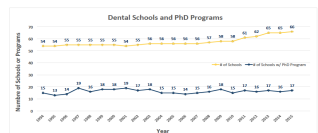


Figure 1. The number of dental schools and the number of schools with oral/biomedical sciences Ph.D. programs in the U.S. from 1994 to 2015 based on ADA annual survey of advanced dental education.

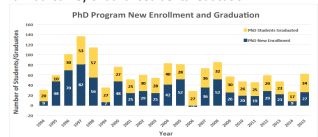


Figure 2. Oral Sciences Ph.D. program new enrollment and graduation in the U.S. from 1994 to 2015 based on ADA annual survey of advanced dental education.

Based on the ADA surveys, although the number of dental schools in the U.S. has increased, the number of oral sciences Ph.D. program remained unchanged from 1994 to 2016. In recent 5 years, among the 65 to 66 dental schools, there were only 16-17 programs enrolling Ph.D. students consistently (Figure 1). On an average, 33 students were enrolled per year into the DDS/PhD, MS/PhD, or PhD training during the study period (Figure 2). However, there was a decrease of enrollment in 2010-2011, which persisted and resulted in an average enrollment of only 21 students per year among all programs in recent 5 years. Incidentally, such decrease corresponded to the decreased cap of National Institute for Craniofacial and Dental Research (NIDCR) training grant direct cost. The number of program graduates was 26 per year in recent 5 years and 30 per year over the study period (Figure 3).

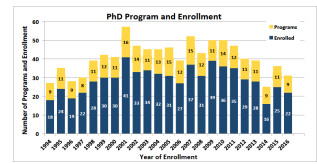


Figure 3. The number of oral sciences Ph.D. program and their enrollment from 1994 to 2016 based on the survey of 21 programs.

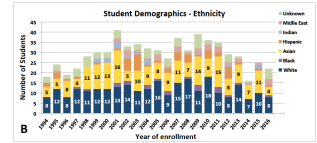
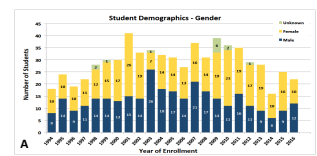


Figure 4. Oral Sciences Ph.D. program student demographic data, A) gender and B) ethnicity, from 1994 to 2016 based on the survey of 21 programs.

From the completed 21 surveys of program directors, we curated the data and cross checked against enrollment and graduation data from the ADA surveys. This allowed correction of some reporting errors in the ADA surveys. Next, we compiled and analyzed data to assess student demographics, enrollment, and placement. The oldest program in this group of surveys was founded in 1964. Many graduates of these programs are known leaders in the dental profession.

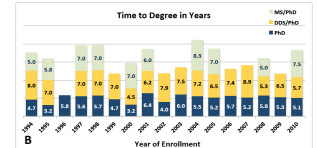
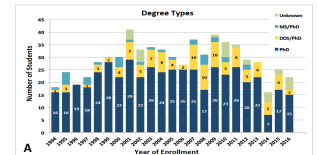


Figure 5. Oral Sciences Ph.D. program A) degree type from 1994 to 2016 and B) time to degree from 1994 to 2010 based on the survey of 21 programs.

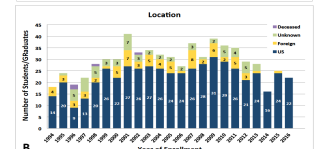
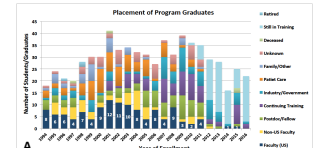


Figure 6. Oral Sciences Ph.D. program A) placement and B) location data from 1994 to 2016 based on the survey of 21 programs.

SUMMARY

According to the 21 program surveyed, 9 programs are based in dental school, 7 are affiliated with health science center, and 5 are affiliated with graduate school. Analysis of the 667 students and graduates reported in these surveys revealed that there were more females (51.1%) than males (Figure 4). Students' ethnicity are white (40.2%), Asian (31.5%), Hispanic (7.6%), Middle East (4.8%), Black (3.2%) and Indian (2.2%). Majority of the students pursued PhD degree (73.8%), while DDS/PhD (17.1%) and MS/PhD (4.6%) together accounted for 21.7% (Figure 5). Among the 581 graduates, majority of them (75.6%) reside in the U.S.. Twenty-three percent of the recent graduates continued to pursue postdoc or clinical training while eighteen percent of graduates are faculty in the U.S. institutions (Figure 6), which amounts to 121 oral sciences PhD graduates entered academia in the U.S. between 1994 and 2014 (Figure 7). Given the vacant faculty positions averaged 260 per year during the same time period, graduates from those 21 oral sciences PhD programs entered academia in the U.S. would have reduced 2.2% of the dental faculty shortage per year, every year from 1994 to 2014.

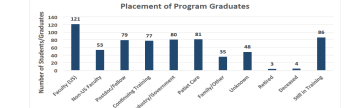


Figure 7. Placement data of 21 oral sciences PhD programs.

Our ultimate goal is to demonstrate the collective activities of oral sciences PhD programs in the U.S.. With this pilot study outcomes, we hope to engage all the oral sciences PhD programs and the American Dental Education Association to devote effort toward collecting and making available the vital stats, specifically enrollment, graduation, and placement of the oral sciences PhD programs in the U.S. on annual basis and assess its impact on dental faculty workforce.

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