Influencing the Dental Workforce in Illinois: A Case Study of the Illinois Children's Healthcare Foundation Pipeline Project

Illinois Children's Healthcare Foundation

FINAL REPORT

Influencing the Dental Workforce in Illinois: A Case Study of the Illinois Children's Healthcare Foundation (ILCHF) Pipeline Project

October 2017

Prepared by
Loyola University Chicago Center for Urban Research and Learning (CURL)

Christine George, Ph.D.
Mary Rojek, Ph.D.
Maxwell Luetkemeier, M.S.

Acknowledgements

Executive Summary

In 2007, ILCHF began a multi-year initiative by funding two Illinois public dental schools, SIU and UIC, with the goal of increasing the number of dentists who provide dental care to all children and who work in underserved communities. While the programmatic features and strategies of the ILCHF Pipeline Project at each school were nested in their particular missions and goals, both aimed to modify their admissions/recruitment process and enhance their students' pedagogical experience in economically constrained communities and with children. Both schools created new or expanded current partnerships with community based dental clinics, primarily at Federally Qualified Health Centers (FQHC), as part of a strategy to increase the experiential learning opportunities in their programs.

This eight-year study, conducted by researchers at CURL, captures key learning related to workforce development strategies. This report contains quantitative and qualitative analysis that show the direct and indirect impact of the program on children in Illinois and also outlines implications for future efforts at developing the dental workforce in Illinois to work with children and in economically disadvantaged communities.

KEY FINDINGS

The report findings demonstrate the positive impacts of this multi-year endeavor by ILCHF, the two schools and the community partners to improve the delivery of oral health to children and underserved communities in Illinois. Both schools increased their services to children. With the new curriculum, cohorts of new dentists gained additional understandings and skills to work with underserved communities and, in a variety of manners, incorporate underserved communities in their practice. The projects not only furthered the mission and goals of the schools and the community health agencies, but also created and/or expanded enduring partnerships between the schools and the community health agencies, which focused on serving and expanding oral health care to children and training future generation of dentists.

Dental care to children increased at both schools

- The number of children who received dental care at SIU's East St. Louis Clinic increased by 57% after ILCHF funding to more than 1,600 children annually. Between March 2012 and June 2014, SIU students provided care to 1,883 children at this clinic.

- UIC estimates that during the five-year grant period students provided care to more than 30,000 children in extramural rotations, far surpassing the amount they served in their on-campus clinic.

Most incoming students exhibit community service ethos

Of incoming students, 91% at SIU and 93% at UIC reported that they hoped to serve children and the economically disadvantaged in their future careers. Influencing factors may include: 1) the school's emphasis on the importance of a pro-civic attitude in their admissions process and specific changes in the admissions policies related to this project, and 2) the work of the Pre-Dental Consortium — supported by this project — that many of the applicants participated in as undergraduates.

Most graduates aim to serve children and the economically disadvantaged in their practice

Enhancing the dental curriculum positively influenced newly graduated dentists' plans.

- The majority of the graduates reported that they intend to include the economically disadvantaged and children in their practice.
  - > One-third of graduates intend to have a working relationship with a community based or public health clinic, in most cases by combining a private practice and work in the clinic.
  - > Sixty-nine percent of those who envisioned primarily working in private practice planned to provide care to the economically disadvantaged.
  - > Seventy-nine percent of graduates planned to treat children, irrespective of their type of practice.

- Surveys of recent alumni at UIC underscored that alumni have been able to incorporate work with children and the economically disadvantaged in their practice.
  - > Almost all the survey respondents (99%) had completed extramural rotations.
  - > Almost all respondents provided care to children (93%) and racial/ethnic minorities (98%) in their practices. A substantial majority (81%) provided care to patients with special needs. The majority (63%) cared for Medicaid patients.

Most important influence: quality of learning experience

Program graduates reported that the quality of their learning experience was a key factor that influenced whether they provided care to children and/or people from underserved communities.

- Across both schools, 85% of the students viewed their training and exposure to public health or community settings that treated the economically disadvantaged as adequate and 88% reported that they felt comfortable working in such settings.

- Similarly, 85% indicated that they received adequate training or exposure to treating children and 84% were comfortable treating children.

- In a longitudinal analysis, which looked at a number of factors, the only significant factor that explained the intention of graduating students to provide care to children or those from underserved communities was the quality of their learning experience. A high quality learning experience was characterized by positive evaluations of the adequacy of their training and their reported comfort in serving underserved communities and children. These findings were true for both SIU and UIC.

Key impacts of the students' learning experience

Students reported the following impacts form their extramural experience:

- Overcoming their fear of working with children
- Behavior management
- Communication with patients
- Understanding a dentist's role in prevention
- Familiarity with other models of care and imagining themselves in the care delivery system
- Proximity to economically disadvantaged individuals and families

Key benefits to the extramural sites

Personnel at extramural sites reported the following benefits to hosting dental students as an extramural site:

- Fitting into the sites' mission and goals
- Recruitment of dentists
- Higher staff morale
- Staff education
- Increased service capacity
- Working partnership with dental schools

Key implementation factors at the dental schools

The dental school reported the following primary implementation considerations:

- Fitting into the mission and goals of the schools
- Having adequate infrastructure in place
- Active buy-in by leadership
- Integrating the new pedagogy into each Dental Schools' learning culture

Sustainability going forward

Both schools are continuing innovations funded by the grant and are moving forward on other initiatives related to treating children and increasing access to care for the underserved.

KEY TAKEAWAYS

This study captures learnings related to three key implementation areas which include workforce development strategies:

- ● *Factors influencing students:* When looking at what impacts students in their decisions in regard to including children and the economically disadvantaged in their future practices, three factors were key considerations: the students' initial values and interests; the quality of the curriculum intervention; and personal considerations. Understanding and addressing all three of these areas are integral to effective intervention strategies to influence students' workforce choices.

- ● *Key curriculum strategies:* The overall goal of increasing the exposure, experience and comfort level of dental students to serve underserved communities and children can be implemented in a variety of settings, from extramural sites to dental school community clinics. But whatever strategy is implemented, certain curriculum components are key. First, the optimal learning experience included didactic preparation for the rotations and opportunities for reflection. Second, students valued learning about the concrete experiences of working with the economically disadvantaged directly from dentists who practiced in those communities. Third, whatever the duration of exposure, it should be one that gives them a firsthand experience with the economically disadvantaged accessing care and the need for dental care, especially for children.

- ● *Benefits to the extramural sites:* The inclusion of student learning at the sites had a positive impact on the sites' provision of community-based oral health care. First, there was more capacity to provide care. Second, there was a reduction in staff turnover in some clinics, which they tied to a positive impact on the sites' organizational culture. Third, the extramural partnerships were often a key step in providing the infrastructure and basis for future collaborations and partnerships with the dental schools. Finally, extramural rotations assisted some the sites in connecting to and identifying future employees.

Table of Contents

Introduction

This is a case study of ILCHF's Pipeline Project: a dental workforce development project. ILCHF provided funding to two Illinois public dental schools, SIU School of Dental Medicine and UIC College of Dentistry, to shape and influence the dental workforce in Illinois in order to increase the number of dentists who provide dental care to children in underserved areas.

This study, conducted by researchers at CURL, captures key learnings related to dental workforce development strategies. The eight-year study involved relevant constituents, i.e., students, alumni, faculty, deans, admissions committees and extramural site preceptors and leaders. The evaluation relied on both quantitative data (surveys and administrative data) and qualitative data (interviews, focus groups and observations). First, we conducted surveys with several years of incoming and graduating classes at both schools which also included three years of longitudinal data, as well as focus groups, interviews and observations with select groups of students. In addition, we conducted a series of alumni surveys at UIC. Second, we conducted a survey with faculty at both schools, as well as interviews with key faculty and administrators. Third, we held interviews with one or more preceptors and/or leaders from each extramural site. (See Appendix III for a detailed methodology report).

This report first looks at the impact of the project on the provision of dental care to children. Second, it looks at the influence of the project on the students' learning experiences and their future work plans. Third, it looks at the implementation of the project at both the schools and at the extramural sites. It concludes with a discussion about implications for replication.

BACKGROUND

ILCHF, founded in 2002, began investing in children's oral health programs in 2004 as part of its overall strategy to make comprehensive health services available to all children in Illinois. The Foundation's early findings that children's oral health was one of the most pressing, unmet health care issues facing Illinois children, resulted in ILCHF's Oral Health Initiative that was created in 2007.

The mission of the Foundation's Oral Health Initiative is "for all children to have access to quality oral health services in their communities and a new culture of awareness to exist throughout the state about the interconnection of oral health and overall health." ILCHF began strategically investing in targeted efforts in three key areas: 1) strengthening and building the capacity of the oral health safety net system; 2) increasing the workforce/workforce development; and 3) increasing outreach/public education/awareness of children's oral health.

In 2007, ILCHF began a multi-year initiative by funding two Illinois public dental schools, SIU School of Dental Medicine and UIC College of Dentistry, with the goal of increasing the number of dentists who provide dental care to all children and who work in underserved communities. While the programmatic features and strategies at each school were nested in their particular missions and goals, both aimed to modify their admissions/recruitment process and enhance their students' pedagogical experience in economically disadvantaged communities and with children. Both schools created new or expanded current partnerships with community-based

dental clinics, primarily at FQHCs, as part of a strategy to increase the experiential learning opportunities in their programs.

Both of these schools also provide direct care to economically disadvantaged pediatric patients. SIU provides a large portion of the dental care to the Medicaid and uninsured population in its region, which is primarily composed of rural areas and small towns. UIC provides care to a culturally diverse urban population.

The workforce development initiative was implemented at an extremely challenging time in Illinois. Beginning in 2008, the nation underwent a recession of historic proportions. This reduced families' discretionary spending on oral health services as well as the number that had health insurance. On a state and federal level, funding tightened at a time when demand for public health dentistry increased.

OVERVIEW OF THE PIPELINE DENTISTRY INITIATIVE PROJECTS

At SIU, there were four programmatic/curricular innovations. First, a new pediatric clinic was established in SIU's East St. Louis clinic in order to increase pediatric dental training for all SIU students. This doubled the time that all 4th year students spent at the East St. Louis clinic and it more than doubled the curricular time devoted to pediatric dentistry. Second, extramural rotation experiences were created for all SIU students at FQHCs. Third, the SIU Rural Scholars program was created as an additional curriculum option aimed at increasing the number of graduates who not only would locate in small towns and rural communities, but also would have practices that would include children and the economically disadvantaged. This program's curriculum included research and didactic components about community and public health issues, as well as an experiential component composed of extramural rotations, which began in the first year of dental school. The Rural Scholars program offered a four-year partial tuition scholarship and a post-graduate fellowship. Fourth, the recruitment and admissions process which already targeted students coming from small towns and rural communities was tasked with identifying, recruiting, and selecting potential Rural Scholars from among those admitted into the incoming class.

At UIC, the primary method of influencing graduates' career and practice choices was via the expansion of extramural rotations with an emphasis on working with children in underserved communities. UIC increased 4th year students' extramural rotation participation rate to 100% and increased the length of time that students spent in rotations as part of the curriculum enhancements. UIC also created pediatric service learning opportunities for students, which began in the first year of dental school and continued all four years. This was accompanied by changes in UIC's recruitment and admissions strategies to increase the recruitment and admissions of dental students who possess a special interest in community-based practice and the provision of care for children and the underserved in Illinois. The key strategy in this endeavor was UIC's sponsorship and coordination of the Illinois Pre-Dental Consortium (IPDC). The IPDC connects pre-dental students at 13 Illinois public and private schools to increase pre-dental mentoring and educate pre-dental students about oral health disparities across the state. This collaborative effort also aims to increase access to care for children in Illinois.

Findings

The following are key results demonstrating the influence of the Pipeline Dentistry Initiative Projects on children and on dental school graduates as well as a description of the projects' implementation processes.

DIRECT IMPACT ON CHILDREN

Children's access to dental care improved in the areas where SIU and UIC students completed community-based rotations. The increase in access to care varied based on the type of clinical site and the type of rotation. (See Appendix I, Section 1)

Dental care to children increased at both schools

SOUTHERN ILLINOIS UNIVERSITY SCHOOL OF DENTAL MEDICINE

East St. Louis Pediatric Clinic
The largest increase in access to dental care for children occurred as a result of the conversion of SIU's East St. Louis Clinic into a primarily pediatric clinic. In the year prior to ILCHF funding, 1,035 children received care at this clinic. During the five-year period funded by ILCHF, approximately 1,620 children received dental care annually, an increase of 57%. Between July 2009 and June 2014, 8,098 children aged 12 and under received dental care in the East St. Louis Clinic. (Table 1.1.1)

> *The number of children receiving dental care in SIU's East St. Louis Clinic increased by 57% after ILCHF funding to more than 1,600 children annually.*

Extramural rotations
SIU students also completed extramural rotations at Southern Illinois Healthcare Foundation FQHC sites in Bethalto, Granite City, and Belleville. Between March 2012 and June 2014, SIU students provided care to 1,924 children at these clinics. (Table 1.1.2)

UNIVERSITY OF ILLINOIS CHICAGO COLLEGE OF DENTISTRY

Extramural rotations
UIC students completed extramural rotations at 15 different community-based clinics in Illinois. The majority of rotations were in Cook County, both in Chicago and the Chicago suburbs. Students also completed rotations in the counties of Lake, Peoria, Whiteside and Winnebago. During the five-year grant period, UIC estimates that students provided care to more than 30,000 children.

Expanded community service
As a component of the ILCHF grant, UIC students also increased the time they spent in community service. Prior to ILCHF funding in 2007/2008, UIC students taught 731 Chicago Public School (CPS) students annually about oral health education and promotion. After the grant was

implemented, that number increased substantially. In 2010/11, 1,609 CPS students received oral health education from UIC students. By 2013/14, that number had more than tripled to 2,611 CPS students. (Table 1.1.3).

> One of UIC's extramural partners adopted a different type of scheduling protocol in that they scheduled patients directly for UIC students. Students worked directly with a dental assistant. This increased the site's capacity by 50%. The number of pediatric visits at this site increased from 4,000 to 6,000 annually.
>
> *"We're able to see about 2,000 extra visits a year because of the [UIC] students. That's out of 6,000 visits total."*
>
> **THE CHILDREN'S CLINIC, Oak Park**

UIC also provided students — and in many cases Illinois Pre-Dental Consortium undergraduate students — other opportunities for community service. This included *Give Kids a Smile Day*, health fairs, sealant application programs and special events such as *Mission of Mercy* and Chicago Bears events. For example, the *Give the Kids a Smile Day* and health fairs reached a total of 950 students during the five-year grant period and an additional 410 in the following year. (Table 1.1.4)

Expanded services to children continue at both schools

At both schools, the expanded services to children have been sustained. At SIU, the East St. Louis Clinic has become the primary site for pediatric training for dental students. Partnerships have developed with community clinics to provide coordinated care to children for more complex and difficult cases. Additionally, extramural rotations at FQHCs have become a permanent part of the SIU curriculum. At UIC the increased capacity to serve children continues, because almost all of the extramural sites provide care to children. UIC also continues to provide oral health education opportunities for children in CPS's, at *Give Kids a Smile Day* events, health fairs and other community opportunities. The Illinois Pre-Dental Consortium continues to provide college students with pediatric oral health education opportunities at health fairs.

INFLUENCE ON STUDENTS

The goal of the ILCHF funding of innovations at the two Illinois public dental schools was to impact the dental workforce in Illinois, influencing the supply of dentists serving the underserved and treating children. The research tracked students' experiences at each school over their school careers and the implementation of the innovations at each school. We surveyed all incoming and exiting students. Incoming students at both schools were surveyed regarding their interests and goals early in their first year of study. In the Exit Survey, graduating students reported on their learning experiences, and their immediate and their long-term dental career plans in terms of location, types of practice and types of clients they envisioned serving. (Appendix I, Sections 2)

Incoming students

Students were pretty evenly divided between women (47.4%) and men (52.5%), with UIC having slightly more women (50%) and SIU having more men (56.5%). While the majority (67.8%) of students at both schools were white (SIU, 83.2%; UIC, 54.3) nearly a third were African American (SIU, 2.6%; UIC, 8.8%), Latino (SIU, 3.4%; UIC, 6.1%), Asian/Pacific Islander or other (SIU, 10.7%; UIC, 30.5%). (Table 1.2.1). Students were from a diverse range of Illinois communities; 70% of SIU students came from small towns, small cities or rural areas. In contrast, 74% of UIC students came from urban or suburban areas. (Table 1.2.2)

Most entering students were interested in general dentistry
Almost all incoming students (93% at SIU and 90% at UIC) indicated that they were interested in general dentistry rather than a specialty as a practice type. (Table 1.2.3)

Most students hoped to become comfortable providing care in community-based settings
Most students hoped to become comfortable treating patients in a public health or community-based setting while they were in dental school: 91% at SIU and 93% at UIC. (Table 1.2.4)

Almost all incoming students hoped to become comfortable providing care to children and special needs patients
Almost all incoming students hoped to become comfortable providing care to children while they were in dental school: 97% at SIU and 92% at UIC. (Table 1.2.5) The small difference between the schools may reflect a slightly greater interest in adult specialties among incoming UIC students. Also, most students hoped that they would become comfortable providing care to special needs patients while in dental school: 93% at SIU and 92% at UIC. (Table 1.2.6)

Incoming students intended to provide care to economically disadvantaged populations
Most incoming students envisioned that they would provide uncompensated or voluntary care in their future practices: 90% at SIU and 91% at UIC. (Table 1.2.7) Fifty-four percent of SIU students envisioned including Medicaid patients in their future practices (UIC students were not asked about Medicaid). (Table 1.2.8)

Community service is important for admission to both SIU and UIC
The large percentage of students who reported that they hoped to provide care to members of economically disadvantaged communities and populations is likely a reflection of two factors. First, admissions committee members at both schools indicated that they carefully assessed applicants to determine whether they exhibited a community service ethos. It was important to both schools to admit students who exhibited an interest in community service and who had prior experience with community service. Second, students may be conveying community service values to admissions committees because they have learned that it is expected of them. Students learn through recruitment approaches such as the Illinois Pre-Dental Consortium that in order to be admitted to dental school, they must show that they have a community service ethos. This may encourage them to reply on surveys in a way that they believe is expected of them.

The overwhelmingly large percentage of incoming dental students at both SIU and UIC who exhibited a community service ethos indicates that these students are open to community service values when they enter dental school.

Graduating students

While the specifics of the curricular experiences at both schools differed, there are remarkable similarities in the reports of graduates at both schools. A majority reported returning to a similar community from which they were recruited. The vast majority of graduates reported intentions to provide dental care to the economically disadvantaged, primarily by including them in their private practice or combining a private practice with work in community/public health clinics. Similarly, high numbers of graduates also reported that they planned to treat children in their future practices. The vast majority of graduates at both schools also positively rated the effectiveness of their training and reported that they had become comfortable working with the economically disadvantaged and with children.

PRACTICE TYPE PREFERENCES

With regard to their longer-term professional goals, the majority of graduates (68%) identified primarily working in private practice (63%) or combining private practice with teaching (5%). However, 33% of the graduates at both schools envisioned working in the non-profit/public sector, with most (30%) hoping to combine private practice with public sector work, and a few (3%) envisioning working solely in the public sector. (Table 1.2.9)

Graduates from SIU were significantly more likely to envision going into private practice or combining private practice with teaching (73%) as compared to UIC (62%). (Table 1.2.10)

LOCATION OF PRACTICE

In terms of their first position after graduation, the majority (52%) of SIU graduates planned to practice in a small town, small city, or rural area, while a large majority (68%) of UIC graduates planned to practice in an urban or suburban area. (Table 2.9) Although some graduates from both schools did not plan to return to a similar community to the one in which they grew up, a sizable percentage planned to return to practice in similar communities. (Tables 1.2.11 and 1.2.12)

PRACTICE CONSIDERATIONS

Graduating students at both schools reported considering a number of issues in deciding where they would first practice. The key considerations were financial (54%) location (50.8%) and career/professional factors (58.9%). Other considerations include additional training (25.9%), life style (13.6%), and type of practice (21.3%)—private or public. (Table 1.2.13)

Plans to serve the economically disadvantaged and children

Service to the economically disadvantaged
The great majority (79%) of graduates indicated that they were planning to serve the economically disadvantaged. The types of practices that graduates were entering influenced these intentions. All (100%) who envisioned either combining private practice with work in a community clinic / FQHC/or government service, or who were working full time in the public sector planned to serve the economically disadvantaged. Sixty-nine percent of those who envisioned primarily working in private practice planned to provide care to the economically disadvantaged. Similarly, 55% of those envisioning combining teaching and private practice planned to provide care to the economically disadvantaged. (Table 1.2.14)

Including Medicaid patients
Graduates were asked if they plan to accept Medicaid patients in their practices. Only a minority of those who intended to work primarily in private practice (28%) or combine private and public practice (43%) planned to include Medicaid patients in their practice.[1] (Table 1.2.15)

Treating children
Again, a large majority (79%) of graduates indicated that they planned to treat children. This did not vary according to how graduates envisioned their future careers. (Table 1.2.16)

Treating children from underserved families and communities
The majority (67%) of the graduates indicated that they planned to treat children from under-served families and communities. (Table 1.2.17)

Quality of their learning experience
The great majority of graduates at both schools viewed their training and exposure to public health and community settings that treated the economically disadvantaged as adequate (85%), and they felt comfortable working in such settings (88%). (Tables 1.2.18 and 1.2.19)

Similarly, the great majority indicated that they received adequate training and/or exposure to treating children (86%) and were comfortable treating children (84%). (Tables 1.2.20 and 1.2.21)

KEY FACTORS IMPACTING PRACTICE PLANS

We analyzed how students' plans and preferences with regard to treating children and the economically disadvantaged were impacted by demographic and programmatic factors (see Appendix II, Sections 1 and 2 for Logistic Tables and Appendix III, Section 4 for complete variable descriptions).

Most important: quality of learning experience
The most important factor affecting whether students provided care to children or those from underserved populations or communities was the quality of the learning experience. A high quality learning experience was characterized by positive evaluations of the adequacy of their training and their reported comfort in serving underserved and children. This was true at both SIU and UIC.

---

1 This question was only asked of the SIU graduates.

We do see other factors in our analysis, even when controlling for the quality of the curriculum, but none are clear, consistent, or strong. These factors include:

Gender
Gender in some cases had an impact. At UIC, women were significantly more likely to report planning to treat the economically disadvantaged, but gender had no impact on planning to treating children. At SIU, gender had no impact on treating the economically disadvantaged, but women were less likely to treat children, although the statistical relationship is weak and only borderline significant.

Race and ethnicity
In some cases, race and ethnicity had an impact. At UIC, African-Americans or Latinos rather than whites were significantly more likely to intend to provide care to the economically disadvantaged; however, race/ethnicity had no impact on providing care to children. At SIU, race/ethnicity had no impact on planning to provide care for the economically disadvantaged. Non-white (African American, Latino and Asian) graduates were more likely to report planning to include children in their practice. However, this was not statistically significant.

Location
Only at SIU did the location of future practice have an impact. At SIU, students who intended to practice in rural, small town/city, or urban areas were more likely—although not statistically significant—to plan to provide care for the economically disadvantaged than those that intended to practice in the suburbs. However, location of future practice had no such impact on including children in one's practice.

Intention to care for underserved
At both schools, intention to provide care to the economically disadvantaged had a statistically significant impact on the intention to treat children in one's practice. While graduates who had the intention to provide care to the economically disadvantaged were more likely to report an intention to include children in their practice, we did not find the reverse (treating children influencing inclusion of the economically disadvantaged) to be the case.

The impact of incoming beliefs and attitudes towards children and the economically disadvantaged on beliefs and attitudes at graduation
Because there is such a high number of incoming students who report an intention to treat children and the underserved, it would seem that this factor alone would explain why graduates envision including these populations in their practices. However, our analysis of that group of students for whom we have survey responses—both when entering dental school and then again at graduation—show that this factor was not statistically significant. *Rather, the only significant factor from the longitudinal analysis is the effectiveness of the curriculum as measured by students reporting their training was adequate and that they were comfortable in treating those populations.*

UIC alumni snapshot

A survey was implemented with UIC alumni classes of 2009–2014 approximately one to two years after graduation.[2] The 36% response rate means that the data reported in this snapshot may not be representative of all UIC alumni. However, it provides an illuminating description of these alumni's experiences in dental schools and their substantial work with children and the economically disadvantaged in their subsequent practice. (See Appendix I, Section 3)

They cared for diverse patients in dental school
Alumni almost universally reported that they had treated pediatric patients, Medicaid patients, racial and ethnic minorities, non-English speakers and diabetic patients while in dental school. (Table 1.3.1) Almost all (99%) had completed extramural rotations.

Finances and lifestyle affected practice and location choices
The most important factors among alumni influencing the type of practice to enter after graduation (i.e. whether they chose private, public health, existing business, etc.) were debt (82%), salary (79%), family/spouse factors (68%) and type of client (66%). (Figure 1.3.1) In choosing where to locate, lifestyle factors (71%) were the most commonly cited factors, but professional factors were important to nearly half (43%). (Table 1.3.2)

Underserved patients were common in alumni practices
Almost all respondents provided care to children (93%) and racial/ethnic minorities (98%) in their practices. A substantial majority (81%) provided care to patients with special needs. The majority (63%) cared for Medicaid patients. (Table 1.3.3)

Many provided pro bono care
Half (50%) provided pro-bono care in the three months prior to the survey, averaging 12.9 hours of care in the three-month time period. (Table 1.3.4)

The majority volunteered
The majority (64%) had volunteered with either children or adults in the past year in a range of community-based settings, either providing dental care or oral health education. Alumni were more likely to provide oral health education (52%) than dental care (43%), and thus were more likely to volunteer with children than with adults. (Table 1.3.5)

Serving children

Younger children were able to access care
The majority of alumni respondents (69%) would accept a child by the age of one year old in their practices and almost all (91%) would accept a child by the age of five. (Table 1.3.6)

Referrals were for behavioral problems
Other than the need for sub-specialty care, the primary reason for referring pediatric patients was for behavioral problems (79%). (Table 1.3.7)

---

2 *While we were not able to include the alumni surveys in the larger analysis for methodological reasons, a comparison of the survey responses of those individuals who were surveyed both at graduation and one year to 18 months after graduation showed similar responses to key research questions regarding treatment of the economically disadvantaged and children were similar at both points in time.*

STUDENTS' LEARNING EXPERIENCE

Examining students' learning experience enables us to understand how the curriculum impacted students. Interviews, focus groups, observations, as well as surveys that were conducted with students and faculty at both schools provide a description of their learning experience, what they learned, and the key curricular strategies that impacted effective learning.

What students learned

Overcoming their fear of working with children

. . . I'm not scared to treat kids now. The preceptors over there let me do my own thing, and develop my own style, so that was great.   —*UIC STUDENT*

Many students indicated that they developed confidence and enjoyed working with pediatric patients, including some who had previously dreaded it. As students had increased exposure and experience working with young children, students at both schools reported being comfortable with pediatric patients. For example, UIC students reported that their extramural rotations included very young children and infants, which were rarely seen in their school-based clinical rotations.

Learning behavior management

The preceptors there are very helpful. With kids, if I sit and have my mask on, they're apprehensive, as opposed to if I start out without a mask. I also demonstrate to them what it will be like by spraying water on the tooth. Then I can also do the procedure. All of the assistants at this site are bilingual.   —*UIC STUDENT*

Students reported that providing care to children helped them to develop their patient-management skills. When they first worked with children, students were often challenged with behavioral issues such as biting, crying, screaming, and general uncooperativeness. They were also challenged as they negotiated their own authority with parents. Not only did students learn how to communicate with children better, but they also developed strategies to respond to difficult children such as immobilization (i.e., papoosing), using nitrous oxide, performing a procedure despite a child's objections, or recommending that a child return on another day. Faculty also noted that extramural education had a positive impact on students' behavior-management skills.

Communicating with patients

. . . and this is me being a lot more comfortable, not even just in treating children but as a general dentist. I just . . . we did get to work with the pediatric dentist a lot more closely and actually get to learn . . . their tricks and things that help things go better . . . .   —*SIU STUDENT*

Students at both schools commented that the extramural experience supplemented what they were learning at the schools' clinics about patient communication. Surveyed faculty concurred.[3] Students had opportunities to learn about patient communication by observing preceptors communicating with patients. Some students adapted preceptors' communication approaches to fit their own style. Students also had opportunities to practice patient communication while they performed exams, prophies (i.e., teeth cleanings), and patient education in extramural settings.

---

3 This dimension only asked in UIC Faculty Survey. See Appendix 1, Section 4.

Refining clinical skills

I have a friend at an out-of-state dental school who hasn't done half the stuff we have. Hasn't done a crown, hasn't worked on a child, and I'm like, "how is that even possible?!" It seems like we've done so much more. People are surprised at what we've done when we put it on our resume.
—UIC STUDENT

Students described how the extramural exposure, in particular the in-depth work experienced by the Rural Scholars and the UIC students (but in some cases even the shorter duration SIU shadowing), provided additional technical training. These ranged from caring or assisting with complex patient problems or cases, to managing a larger volume of patients with procedures such as exams, extractions, and fillings. Most surveyed faculty viewed the extramural rotations as having a positive impact on students' clinical skills and productivity.

Improving reasoning skills

. . . you know, they can't afford the three-unit bridge so they have to do the next best thing for them . . . you might have to pull the tooth . . . It's like they can't really do the best because they can't afford it. So I feel like here, they do the best they can with what they're given . . . .   *—SIU STUDENT*

Students indicated that they improved their clinical reasoning skills, and surveyed faculty concurred.[4] Students reported that they learned new techniques from preceptors and they learned that there was more than one way to do things. This led some to consider how best to provide care in any given situation. For example, when providing care to patients with limited economic resources, some students were able to understand that extraction might be a better choice for a specific patient than restoration.

Understanding a dentist's role in prevention

But I think the biggest thing I've learned is that I didn't realize how important education is. I thought everyone knew not to give your kid soda before they go to bed. *—SIU STUDENT*

Extramural sites offered students an opportunity to think about prevention and its role in a dental practice; that did not seem to be emphasized in the schools' curriculum. Students' conception of prevention and how and where it fit into the practice of dentistry in all settings was challenged at the extramural sites. Many students at both schools had a tendency to devalue some of the work that they did in community-based settings, especially when it involved patient education, exams, or prophies. They did not appreciate the significance of these activities as components of prevention or that these activities might constitute a substantial portion of their future practices. Some UIC students viewed patient education as someone else's job (e.g. the schools or the media) and not as something a dentist would do. SIU students were more likely to identify patient and parent education as a component of the dental work done at FQHCs compared to SIU dental clinics. Some students began to realize that children and their parents did not understand aspects of basic oral health or nutrition that the students took for granted (e.g. infants should not drink soft drinks from baby bottles or children should not drink sugared beverages before bedtime). Some students began to realize that the task of educating parents about these issues fell to them.

---

4 *This dimension only asked in UIC Faculty Survey.*

Increased professionalism and preparation for the job market

. . . Not only with all the dentistry stuff, but how to keep an office running. What a small town practice needs as far as to keep a patient flow going. *—SIU STUDENT*

Students spoke about how the extramural rotations prepared them to enter practice. Increased professionalism was a result of multiple factors. Students' success in extramural sites increased their confidence in their capability of working in a real world setting. In dental schools, the student role was that of learner, but the extramural rotations provided many students with extensive experiences as dentists-in-training or junior colleagues in community settings. Some students reported that they had learned to integrate different types of knowledge into dental practice (i.e. patients' specific needs with the knowledge of how to provide care to them). Students believed that their confidence, their ability to succeed in extramural settings, and their ability to provide pediatric care positioned them better for the job market. Most surveyed faculty viewed the extramural rotations as increasing students' professionalism.

Become familiar with other models of care and imagining themselves in the care delivery system

Before the rotations, I thought that private practice was the only model for where you could work. Now I know that there are so many different types of dentists, and on your own you can choose what you want to do. I've seen that you can also work in public health clinics. And if you're on your own, you can create the type of practice you want. The rotations really opened my eyes to that. *—UIC STUDENT*

At both schools, students talked about how the extramural rotations showed them that public health dentistry and community-based practice were career options. Students learned that there were models of practice other than private (e.g., FQHCs, community clinics, closed panel, and philanthropic supported clinics). Both students and faculty reported that they were impressed with the "state-of-the-art" quality of many of the FQHC clinics. Students viewed the benefits of FQHC employment as increasing their speed, loan forgiveness and providing a stable income. Although many SIU graduates wanted to provide care to the economically disadvantaged, they did not view Medicaid as a feasible economic model, especially given the low reimbursement rates in Illinois. At SIU, speakers who had successful practices with pediatric Medicaid patients were able to persuade some students to consider including Medicaid patients in their future practices. UIC students who became aware of community service models and opportunities later integrated these approaches into their future practices either by volunteering or by creating their own community service programs. In some cases, UIC students who had rotations at sites that provided volunteer opportunities later volunteered at these sites, either while they were still students or after graduation. Some of the sites reported that they had hired students who previously completed rotations at their sites. In some cases, this was immediately after graduation, while in other cases, it was a few years after graduation.

Proximity to economically disadvantaged individuals and families

So I think that's the biggest thing that it's taught me: that there's definitely a need to serve that community. I guess seeing a couple Medicaid patients at our school isn't really going to show you or open your eyes to it. You think 'That person is just unfortunate' or whatever compared to the rest of my patients. But no, it's a huge community and you only got to see a couple of them at our school. I'd say the people at the FQHCs, those who usually go to the FQHCs tend to be more poor than most of our patients, which I don't think that all of the people at our clinic think or know that.
—SIU STUDENT

Students received a much more proximate understanding of community members' realities of limited access to dental care.

The scope of the need for dental care
UIC students discussed becoming more aware of the specifics of access to care in the city and in the suburbs. In a reflective seminar, one UIC student described learning of the extent of the need across the Chicago area after having been on a dental van. Students were surprised to discover that there was suburban poverty and that suburban residents had difficulty accessing care. SIU Rural Scholars recounted how their biannual FQHC rotations enabled them to better understand the need for dental care in underserved and poor communities.

The complexity of patients' lives
Students discussed that working in community settings made them aware that patients and their dentists must make dental care decisions that are constrained by economic factors. It was challenging, however, for many students to see patients in a comprehensive way beyond their oral health needs. Students described the "difficulty" they had when they encountered patients with complex psychosocial issues and trauma problems. They felt unprepared to deal with these situations.

Understanding the lack of oral health in disadvantaged populations
Some students were shocked and dismayed by the poor oral health and knowledge of the patients they encountered, whether it was the children treated at the East St. Louis Clinic or the children or adults at UIC's or SIU's extramural sites. These experiences challenged a number of their assumptions. They had taken for granted that knowledge about oral health and prevention was common knowledge throughout society and easily acquired. Many assumed that poor oral hygiene was due to individual or parental neglect and/or personal failures. Students began to see that poor children and their parents often did not know about oral health, prevention, or nutrition.

Learning about policies and public initiatives
Students talked about how factors such as public policies, funding and systems affected care. Students began to recognize that the problem of access to care was a broader socioeconomic issue that needed to be addressed by public policy. This was a common feature of reflective seminars at UIC. For example, SIU Rural Scholars surveyed and interviewed dentists practicing in the towns of Southern Illinois about their willingness to accept Medicaid patients. Through that process they gained a better understanding of the challenges and barriers in accepting Medicaid in private practices. Students began to grapple with what needed to be in place, besides their willingness to "do good" to meet the dental care needs of the economically disadvantaged in their future practices.

EXTRAMURAL SITES' EXPERIENCE

The heart of the extramural experience is the partnership between the dental schools and the community clinics. In this section we examine how dental schools and community clinics decide to partner, how extramural sites assess the benefits of the partnerships, and which factors affect the partnerships.

Extramural sites' experiences were assessed based on interviews with CEOs, executive directors, senior administrators, dental directors, and preceptors, as well as from observations of UIC annual preceptor meetings, and observations at extramural sites. Sixteen interviews were conducted with one or more representatives, usually the CEO or the program head, at all 10 of the agencies that had active extramural sites at the time of the interview.

The partnership decision

Partnerships between dental schools and extramural sites for extramural rotations were initiated in a variety of ways. There was often a prior relationship between the dental school and the sites such as a referral relationship, a community-level partnership relationship based on common interests in a public health issue, philanthropic support of a partners' activities, or other personal and professional relationships between the leadership of the dental school and the community clinic. In addition, in some cases, preceptors or dental directors at the sites were former students of the dental school. Students initiated a few partnerships because a student wanted a rotation in his or her hometown. While a community clinic's main motivation in initiating an extramural partnership was often driven by a desire to directly increase their capacity, an extramural partnerships was only selected by the schools if the school viewed that it could provide students with a high quality educational experience.

Fit into mission and goals

Respondents identified the main areas in which the extramural rotations fit into their mission and goals. These included providing dental services to their community, education and building a workforce. The most common responses were related to providing dental services. Responses varied based on individuals' positions within the organization. Responses that focused on service and students were more common among individuals who were preceptors and dental directors. Responses that focused on the workforce were more common among CEOs and administrators.

Organizational capacity

Respondents at extramural sites described the importance they placed on assessing whether their sites had the organizational capacity to provide both patient care and engage in student training when they first became involved in the partnership. Organizational capacity refers to the adequacy of both physical space for the students to work and the staffing to supervise and mentor students.

Benefits to the extramural sites

RECRUITMENT OF DENTISTS

A key benefit cited by most extramural sites was the recruitment of future employees. In fact, at least four sites reported that they hired graduates who had previously participated in an extramural rotation at their site. Some respondents likened the extramural rotations to a working interview in which students and dental staff learned about each other and could assess whether working together in the future would be a good fit. One administrator commented that it had "reduced employee search costs." A preceptor at one extramural site located in a distant county indicated that prior to their involvement with the extramural rotations, they had difficulty recruiting good dentists to their clinic. Others cited instances of students who had left Illinois after graduation but returned years later and were employed by the clinic where they had completed rotations. Site respondents viewed the rotations as beneficial even when former students ended up working at other FQHCs or community-based clinics. One stated, "[whether it is working] for us or someone else…it is part of our community health mission."

HIGHER STAFF MORALE

Administrators noticed an improvement in staff engagement as a result of students' presence. Students brought a new energy to the clinics. Some administrators noted an improvement in staff morale and retention and a decrease in staff burnout due to students' presence in the clinic.

STAFF EDUCATION

Students helped to educate dental staff, thus keeping staff dentists' skills up-to-date. This occurred when students asked questions or brought information about dental innovations or the healthcare environment to the clinic. If students asked questions that staff dentists could not answer, then staff dentists either sought out the answer themselves or had students follow up on campus. Dental schools also supported preceptors' continuing education by providing them with library access or other educational opportunities.

MENTORING STUDENTS

Preceptors often discussed how personally rewarding their relationships were with students. They found it gratifying when students enjoyed the rotations, offered positive feedback and enjoyed when students returned for a second rotation. Respondents stated that they enjoyed teaching, networking with students and being able to influence them in their careers.

AN INCREASE IN THE RESPECT OF THE CLINIC

A few sites' informants noted that students' presence also improved patients' perceptions of the clinic and of staff dentists. Some patients perceived the clinic as a trusted dental partner of the dental school. Respondents noted that some patients interpreted students' presence to mean that staff dentists were skilled enough to be training students, so that they had more confidence in their dentists' abilities. One dental director noted a similar effect of increased respect from other dental staff as a result of student's presence.

INCREASED SERVICE CAPACITY

The extramural rotations often resulted in a marginal increase in a site's capacity to provide dental care. Some sites were able to accept more walk-in patients or overbook slightly when students were present. In these cases, patients were assigned directly to students and students generally had a dental assistant working with them. Alternatively, if a staff member was absent, then a student might be able to take over some of the staff members' responsibilities. Three of UIC's extramural sites reported a slight decline in their waitlist, while one of UIC's sites reported a substantial decline in their waitlist from three months to one month. While students were providing patient care, staff members were able to catch up on other tasks that needed to be completed. Three sites reported no changes in their capacity to provide care and two sites reported a slight decline in their capacity due to the necessity of supervising students and/or a limited number of chairs at their clinics. Whatever the impact on capacity, it was clear from more than one informant that the quality of the students was excellent. One administrator noted that "it isn't a dumping of students" as he had experienced with some other health professional internship programs.

WORKING PARTNERSHIP WITH DENTAL SCHOOLS

At SIU, the referral relationship between SIU and the FQHC in Bethalto strengthened substantially, including that Bethalto was able to refer their complex special needs patients to SIU's School of Dental Medicine. In addition, UIC supported its extramural partners as they sought grant funds.

Key issues for implementing and maintaining a successful partnership

CLARITY OF ROLES AND EXPECTATIONS

The rotations seemed to work better and respondents were more satisfied when all involved had realistic expectations about the rotations and when roles were clearly defined. For the extramural sites, they needed to have a clear idea about what they were trying to achieve as a result of the extramural rotations. The duration of a rotation affected what could be achieved. Short rotations were more likely to be a shadowing experience while longer rotations provided students with more extensive clinical exposure. Whatever the duration, the rotations worked better when the dental schools and students had reasonable expectations about student training at the extramural sites.

The role and authority of preceptors and administrators also needed to be clear, especially in the longer rotation experiences in which the students had longer clinical exposure. Clarification by the schools as to the teaching role of the preceptors—for example at UIC they are adjunct faculty—was helpful. In addition, some preceptors suggested that when schools provided preceptors with additional information about students' skills, it enabled them to have more confidence in assigning appropriate patients and tasks to students.

CLARIFYING STUDENTS' ROLE TO PATIENTS

Some extramural sites found it challenging to obtain patients' consent for students to provide dental care either to an adult or to a child. Some sites informed patients that the consent form they had signed permitted students to provide dental care. Others reassured patients verbally that students were being supervised by the preceptors. In some cases, patients or parents refused to allow a student to provide care. The primary concern voiced by a few respondents at extramural sites about having students provide dental care was that if students were providing care, then a patient might not feel they had a dental home or a regular dental provider. They worried that this could weaken the relationship between a preceptor and their patients.

PROGRAM INFRASTRUCTURE

Both the extramural sites and the dental schools had to develop the program infrastructure (i.e., policies and procedures) for the extramural rotations to be successful. This involved establishing formal agreements between the schools and the extramural sites, developing a system for students to obtain the required pre-rotation screenings, conveying information about the sites, developing a related curriculum and developing an evaluation system. The extramural rotations functioned best when the dental school had the organizational capacity (i.e., the staffing) to coordinate the rotations. For example, the UIC extramural team includes multiple faculty and staff membership and is a model of staffing infrastructure for a curriculum that has a large extra-mural education component. This designated team communicated information to the extramural sites in a timely fashion and was available to respond quickly when issues arose.

COMMUNICATION REGARDING STUDENTS

Most respondents at extramural sites were satisfied with the amount of communication between them and the dental school. Most of the communication occurred between the extramural site coordinator/preceptor/dental director and the dental school coordinator. Among respondents who wanted more communication with the dental school, they would have liked feedback when they reported problems with a student, information about other programs or meetings at the dental school and more information about the students who were coming to their clinics.

A GOOD WORKING RELATIONSHIP

The partnership worked best when there was a good relationship between the partners at multiple levels. At an organizational level, the partnership benefitted when there was reciprocity, such as assistance from the dental school with extramural site's fundraising or acceptance of referrals by the dental school. At the faculty level, the partnership benefited when there was a clear collegiality and formal faculty role between the site preceptors and the school. For example, at UIC, preceptors were adjunct faculty and annual preceptor meetings contributed to a sense of collegiality — although limited — with extramural program faculty at the dental school. Preceptors' primary relationship was with the dental school program administrator and with the dental students and they found both of these relationships useful and satisfying.

BUILDING COLLEGIALITY BETWEEN PRECEPTORS AND FACULTY

In examining the dental school/extramural site partnerships, we observed challenges with building a strong sense of connection between the preceptors and the school as well as good relationship models and existing relationships that could be built upon.

Challenges

Preceptors often did not feel comfortable contacting dental school faculty with questions about patients. Instead, some asked a student to serve as an intermediary and consult with dental school faculty members. Faculty development was rarely extended to adjunct faculty respondents. For example, they were not informed about how to be better educators, evaluate students, update their knowledge and skills or improve patient communication. Some preceptors indicated that they would have liked information or support in the form of continuing education opportunities or access to library resources. The dental school could also provide preceptors with information about the changing healthcare environment, which is information that one preceptor received from students.

Models and relationships to build on

UIC held an annual meeting for preceptors. This provided an opportunity for the dental school leadership to express gratitude to those at extramural sites for their efforts and for the benefits they provided to students. The focus of the message was on extramural sites' contributions to dental student education, but also to update the preceptors about the dental school's planning and other relevant issues. Even though some sites were not able to send representatives to these meetings, the meetings were a good way to reinforce the partnership between the dental school and the extramural sites. In addition, there were more formal education connections between some preceptors and the schools. A few preceptors mentioned accessing continuing education classes and/or courses. A number of the preceptors were alumni of their partner school. Not only did this provide a basis for informal collegiality but it also led to more formal access to information about continuing education for those alums.

IMPLEMENTATION: KEY FACTORS

This section examines how each school implemented the ILCHF funded initiatives and key strategies and challenges. Information from this section is from observations of various meetings at the schools, reviews of administrative documents, interviews with key faculty and leaders and a faculty survey at both schools.

Fitting into the mission and goals of the schools

At both schools, the programmatic features and strategies associated with the curricular inno-vations were nested in each school's particular missions and goals. Both schools saw the ILCHF RFP as an opportunity to advance their mission. To recap, both aimed to modify or enhance 1) their admissions/recruitment process, 2) their curriculum and students' pedagogical experi-ence in economically disadvantaged communities and with children and 3) dental services for children in economically disadvantaged communities.

> *It's a two parter. It moved the school forward on those goals because it allowed us to expand our own programs to provide access to care. We expanded the East St. Louis program tremendously …we're treating kids three days a week in that clinic …You know, we're treating the more reticent kids, if you will, with sedation there …this has really increased the access to care in a major underserved area, which is East St. Louis.*
>
> **B. ROTTER, Dean, SIU**

SIU

SIU's primary mission is the development of skilled dentists to "help meet the oral health needs of the population in Southern Illinois." SIU recruited and admitted a significant portion of students from small towns, small cities and rural areas in Southern Illinois. In addition, through their Alton and East St. Louis clinics, SIU has been one of the main providers of dental care in Southern Illinois, especially for the poor and uninsured. The Rural Scholars Program allowed SIU to enhance their curriculum to produce skilled dentists for these primarily rural areas of the state. The hiring of a pediatric dentist as the director of the East St. Louis clinic and the expansion of that clinic's services to children fit into their goals of increasing access to care.

UIC

At UIC, the extramural program was already very robust and the school had a strong emphasis on Public Health, with an Associate Dean whose focus was on Public Health initiatives and education. First, the ILCHF grant moved UIC's leadership forward and bolstered support for the Pre-Dental Consortium, which allowed it to create an even more robust and diverse pipeline of students into dental schools. Second, UIC had been a recent recipient of a Robert Woods Johnson Foundation Pipeline Grant, which supported the school in developing a dental workforce that would serve minority communities by bring more minority students and faculty into the school. The ILCHF grant allowed the school to continue, in new ways, through the expansion of its extramural education and public health curriculum to continue on its mission to serve under-served communities.

> *Students see more children in rotations than in pediatric dentistry at our clinic. The sites we select, we do so with an awareness of their particular biases/mission toward children. We adapt to their policy/practice approach… [The] mission of serving children is in line with a public health mission, and preventing something in a child has a lifelong effect.*
>
> **CASWELL EVANS, Associate Dean, UIC**

Having adequate infrastructure in place

An important part of implementing any program or initiative is having sufficient infrastructure such as policies and procedures as well as staffing in place. SIU and UIC had very different experiences in this respect. Given the different experiences observed between the two schools, it is clear that program planning and evaluation are components of infrastructure that must be built into project timelines and budget.

SIU

SIU had the bigger challenge because it had to develop new programs from the ground up. At the East St. Louis Clinic, they had to convert the majority of that clinic from a family clinic that primarily served adults into a pediatric clinic. Next they had to develop an entirely new program, the Rural Scholars program, which entailed putting in place recruitment and selection processes, a curriculum and new partnerships with extramural sites. Third, SIU had to develop an extramural component for the general curriculum. Finally, while there was new staffing allocated for the East St. Louis Clinic, SIU underestimated the staffing time needed to implement the other components of their initiative. The program director not only had to continue in her current faculty role, but she also served as the primary educator and mentor for the Rural Scholars, the key developer of the extramural network, the point person for the initiative within the school and the primary administrative coordinator. This put a strain on the implementation process, and caused a delay in meeting milestones. For example, it took much longer to establish the extramural partnership than had been foreseen. In addition, a supplemental curriculum that was supportive of the general extramural rotations was not developed. However, the program director's course load was reduced and some resources were reallocated to administrative support, which led to a partial remediation of this issue.

UIC

At the outset, UIC had a well-developed program infrastructure and personnel in place as a result of prior funding for an educational initiative by the Robert Woods Johnson Foundation that included a network of extramural partners. An Associate Dean led the public health effort at the school and developed and taught the supporting extramural education course. In addition, two key faculty members were responsible for developing and maintaining relationships and protocols with the extramural sites. Finally, a public health professional coordinated students' extramural assignments, participated in teaching students and maintained the administrative records with other staff support. With this programmatic structure in place, UIC was able to meet its milestones in a timely manner and address challenges related to the expansion and modification of the rotation scheduling.

Active buy-in by leadership

At both schools, the role of the faculty and administrative leadership was key to the implementation process. The dedication and leadership demonstrated by faculty and administration was a key component to ensuring implementation of this project while maintaining the quality of their academic mission.

Fitting into the dental school's learning culture

As the quote below states, the ILCHF-funded curricular initiatives at both schools were an opportunity to learn skills that would advance students learning.

> *When we have residents that come in from other schools, a lot of them haven't done a crown, haven't done a pulpotomy, haven't done a lot of procedures on children, and they may have done no procedures on kids that are uncooperative… So this is providing a great, a good opportunity for them [SIU dental students] to learn from.*
>
> **Interview with SIU pediatric dentist**

Yet it can often be difficult to acknowledge the value of the opportunity of new pedagogical experiences to the core curriculum and the learning culture. Contrary to the statement above, some students at both schools saw the new pedagogical experiences as juxtaposed, or marginal, to learning the technical skills of dentistry. Some students viewed learning about treating children and/or assisting in an extra-mural site as a distraction from the standard learning requirements. A few students reported being supported in this view in their discussions with a faculty member, and a few faculty members in a survey expressed a concern about extramural education decreasing opportunities for technical skill development.

Yet in general, as the ILCHF projects developed at both schools, it is clear that the new pedagogical experiences were seen as enhancing the learning mission at both schools. Almost all the surveyed faculty viewed extramural education positively and viewed it as contributing to fulfilling their respective school's mission. (Table 1.4.3).

At both schools, the leading faculty used communication and flexible program implementation to facilitate the integration of the projects. Leading faculty at both schools conducted formal meetings and presentations in faculty meetings to apprise and include faculty in the development of the curricular changes. The new curriculum was presented and discussed as part of other curriculum changes that were also occurring at the schools, and there was a clear feedback between the implementation of the program and its interaction with other pedagogical requirements. For example, there were numerous modifications and experimentation with schedules at both schools to determine when in the students' matriculation their site visit placements should occur.

However, even with all this communication, and even though the faculty saw the program as fitting into the schools' missions, half of surveyed faculty had professed to not having enough knowledge about the program to assess its impact on students. (Table 1.4.1) This is not surprising; in most institutions with multiple fields of concentrations and departments, faculty can be "siloed," and most are knowledgeable only with those issues in which they have professional expertise and/or hands on, day-to-day experience.

This fact points to the importance of communicating about the impact and lessons learned on a continuous basis. In that continuing communication strategy, informal means of communication should not be overlooked, as they are key. For example, to the extent faculty reported knowing about the specifics of the initiative, the most common source of knowledge was informal discussions with fellow faculty or students. Among SIU faculty, 72% learned about community-based education programs from informal discussion with students, while 61% learned from informal discussions with other faculty members. At UIC, 58% of faculty members learned from informal discussions with other faculty and 54% from informal discussions with students. (Table 1.4.2)

The challenges of rural scholar program implementation

At the end of the SIU ILCHF initiative, it was decided to discontinue the Rural Scholars Program, one component of the SIU initiative. The goal was for 16 students to successfully participate and complete this five-year program.[5] As of the 2015–2016 academic year, only 5 of 16 students had completed the AEGD program. There were challenges in implementation process but the main challenge was in the design of the model itself. The Rural Scholars model was adapted from a model (the R-Med model in Rockford, IL) in which individuals were recruited into the program before admissions, a scholarship and a robust didactic support system was put in place to assist students during their matriculation into the program. In the Rural Scholars model, the key feature became a partial tuition scholarship and the 5th year fellowship, rather than admission into the school itself. The scholarship and the fellowship, however, was found not to be an adequate economic incentive for a majority of the students to remain in the program. SIU decided not to continue the program going forward beyond the grant period. However, SIU is continuing to examine strategies for achieving its goal to place dentists in underserved areas.

SUSTAINABILITY

Other than the Rural Scholars program, both schools are continuing the innovations funded by the grant and are moving forward on other initiatives related to treating children and increasing access to care for the underserved. At UIC, this includes an expanded extramural program and support of the Pre-Dental Consortium. In addition, UIC subsequently received a five-year federal grant to support expansion of their extramural program to focus specifically on children 0–5. At SIU, the brief extramural rotations have been incorporated into the curriculum, as have the pediatric training at the East St. Louis Clinic. In addition, discussions with Dean Rotter and other key leaders at SIU point to a more explicit inclusion of pediatric dentistry into their conceptualization of general family medicine. The clinic continues to focus primarily on providing pediatric services for three of its five clinic days. This is critical, since SIU sees itself as primarily training the general family dentistry workforce. SIU has developed a strong working relationship with Southern Illinois Healthcare Foundation on a number of initiatives related to the improved delivery of care to children. ILCHF has funded collaboration between the two organizations for special needs children. SIU has also created longer extramural experiences with at least one county clinic for its most advanced and prepared D4 students.

---

5 *The fifth year was a graduate program, Advanced Education in General Dentistry Program (AEGP).*

DISCUSSION: KEY TAKEAWAYS

This study captured findings related to workforce development strategies as well key implementation factors to consider. Before proceeding, let us take a minute to note again that this project not only influenced and enhanced curriculum at both schools, but also expanded both schools' services to children. For example, at SIU the number of children receiving dental care in SIU's East St. Louis Clinic increased by 57% after ILCHF funding to more than 1,600 children annually, and the extramural rotations at community clinic brought care to an additional estimated 380 children a year. Additionally, UIC estimates that during the five-year grant period students provided care to more than 30,000 children in extramural rotations, far surpassing the amount they served in their on-campus clinic.

Key factors influencing students

When examining what impacts students in their decisions to include or not include children and the economically disadvantaged in their future practices, three factors seem key considerations: the students' initial values and interests, the quality of the curriculum intervention and personal considerations. Understanding and addressing all three of these areas are integral to effective interventions strategies to influence students' workforce choices.

INITIAL VALUES AND INTERESTS

Most incoming students reported that they hoped to serve children and the economically disadvantaged in their future careers. Influencing factors may include the schools' emphasis on the importance of a pro-civic attitude in their admissions process and specific changes in the admissions policies related to this project, the work of the Pre-Dental Consortium (supported by this project) that many of the applicants participated in as undergraduates, and/or the pervasiveness of service learning and pro-civic activities in high school and college. Clearly this suggests that any effort that emphasizes the importance of serving underserved and vulnerable populations as part of the mission of the dental profession is a valuable early component of any work force strategy. This includes the Pre-Dental Consortium or policies in the recruitment/admissions process.

QUALITY OF THE CURRICULUM INTERVENTION

The quality of the students' curricular experiences with children and the economically disadvantaged was a key influence on graduates' attitudes and plans at graduation regarding the inclusion of these patients in their practice. As students described their extramural[6] experiences, certain factors seemed key components of an effective learning strategy.

First, the curriculum intervention needs to expand—and be valued as expanding—the students' clinical abilities. For example, students and faculty noted that the extramural and community clinic experience improved students' clinical skills. Students reported that providing care to children increased their patient management skills as they were challenged with behavior issues such as biting, crying, screaming and general uncooperativeness. Observing their preceptors

---

6 At SIU, for most students the in-depth clinical experience with children occurred at the SIU East St. Louis Clinic.

communicate and reason with patients helped students learn about patient communication skills. Additionally, students' clinic skills were enhanced as they became involved in a wide array of services from providing or assisting in complex patient cases to managing a larger volume of patients with procedures such as exams, cleanings, extractions and fillings.

Second, there were opportunities for the students to grow in their confidence and to become better prepared for the job market and for professional opportunities over their work career. In particular, the extramural experiences allowed them to familiarize themselves with diverse models of care and to imagine themselves in the care delivery system. The extramural practice sites included FQHCs, County and Municipal health departments, and philanthropically support clinics.

Third, the community clinical experiences provided students with a proximity to economically disadvantaged individuals and families and an opportunity to experience the scope and needs of dental care in various communities. In addition, students had an opportunity to learn how public policies, financing and organization affects patient care by attending community/public health classes and debriefing sessions and discussions with preceptors. Students began to recognize that the problem of access to care was a broader socioeconomic issue that needs to be addressed by public policy.

PERSONAL CONSIDERATIONS

Personal considerations such as income, debt, family and community of origin were prime factors in individuals' decisions of where to locate and what kind of practice to engage in. Of the 80% of dental students who graduated with debt in 2016, the average debt was $262,119, according to the American Dental Association.[7] This underscores strategies such as targeted recruitment and tuition reimbursement, or postgraduate debt forgiveness programs tied to serving in specified geographic areas and populations, all strategies recommended by the American Student Dental Association (ASDA) to address the "growing student debt crisis."[8]

Key curriculum strategies

PREPARATION, CLEAR LEARNING GOALS, AND A REFLECTIVE COMPONENT

The optimal learning experience included didactic preparation for the rotations, information about the sites and the rotation experiences at specific sites, and opportunities for reflection. The didactic preparation helped students to have some understanding of public health dentistry and the care provided in community-based settings. Students obtained information about the extramural sites from both the dental school and from other students, which provided them with realistic expectations about the extramural experience. Some students however, said they needed more clearly defined learning objectives prior to their rotations so that they could better understand what they should focus on while they were in community settings. Opportunities for post-rotation reflection helped students clarify and solidify what they were learning.

7 American Dental Association. (2017). Educational Debt. Retrieved from http://www.adea.org/GoDental/ Money_Matters/Educational_Debt.aspx#sthash.BYeiWnxd.p3lT9ttr.dpbs

8 American Student Dental Association. (2017). Dental Student Debt. Retrieved from https://www.asdanet.org/ index/get-involved/advocate/issues-and-legislative-priorities/Dental-Student-Debt

This was best illustrated in the UIC extramural program where student debriefings were a systematic part of their extramural course. The goal of these sessions was for students to make sense of their extramural experiences and to provide faculty with insights into the pedagogical value of the experiences. At SIU, the Rural Scholars' program required monthly sessions with the Rural Scholar faculty advisor; this provided a structured opportunity for discussion—or at least education—that was complementary to the rotations. However, debriefing of students' extramural experiences, was not the explicit goal of the monthly sessions.

MODELING

Students at both schools valued learning from practicing dentists about the concrete experiences of working with people facing economic disadvantage. UIC students learned from extramural site preceptors who were often themselves UIC graduates. For SIU Rural Scholars, their curriculum included guest speakers such as practicing dentists. Most Rural Scholars found these talks to be helpful, especially the information from the pediatric dentist who accepted Medicaid. Most Rural Scholars were eventually persuaded that it might be possible to accept Medicaid patients in their practices.

A high quality experience at an extramural site was critical to students having a positive learning experience. First, a high quality extramural rotation experience included students having well-planned and consistent exposure to the populations of interest. Second, the site had to have adequate capacity, both in terms of adequate physical space for students and adequate staff to provide oversight and direction to students. Third, given that many sites often experience high appointment failure rates, it is helpful to develop strategies so that students are not idle. This may include scheduling strategies to accept more walk-in patients or by providing other educational experiences at the site. Fourth, the state-of-the-art equipment at many of the facilities had a positive impact on many students. Whereas students previously viewed FQHCs as "junky," they learned that FQHCs were modern facilities with new technology. Fifth, and perhaps most importantly, when students established relationships with preceptors, they viewed their experiences more positively.

DURATION OF EXPERIENCE

In the UIC graduating student survey data, we found a positive—but not statistically significant—relationship between the duration of the extramural experience and a positive rating of the adequacy of training/exposure. This relationship was echoed in focus groups and interviews with SIU Rural Scholars. As students progressed through their program, had repeated exposures at multiple extramural sites and performed various procedures, they were better able to begin to understand the scope of the access problem and the need for dental care, especially for children. Even with the short experiences of the SIU general student program, most of those graduates still overwhelmingly were likely to include children and provide pro bono or voluntary care in their future practices. Faculty observed that the brief rotations were still very valuable because they demonstrated the setting as a career option and provided networking opportunities.

Key benefits to the extramural sites

The inclusion of student learning at the sites had a positive impact on the sites' provision of community based health care. First, there was more capacity to provide care via accepting more walk-ins or overbooking slightly when students were present, hence reducing wait-lists.

Second, there was a reduction in staff turnover in some clinics, which was tied to a positive impact on the organizational culture of the sites. The morale of the clinic staff, from hygienist to dentist, was positively affected. Staff saw the value in their skills as they mentored and taught the students. Additionally, some staff reported that the new dental information that students brought to the sites from their classes and clinicals were valuable to their own professional development. In addition, there were instances that patients were impressed by the partnership with schools, which increased the prestige of the dentists in their eyes.

Third, the extramural partnerships were often a key step in providing the infrastructure and basis for future collaborations and partnerships with the dental schools. For example, the SIU partnership with Southern Illinois Healthcare Foundation that developed around the extramural partnership went on to collaborate on a multi-tiered approach to treating children with special health care needs that was identified as a tremendous need in the area. The partnership continues to thrive and serve the most vulnerable population of children. At UIC, the wide range of extramural sites exposes students to both urban settings and other areas around the state. It also strengthened the referral relationships between the sites and the specialty oral health services provided at UIC.

Finally, extramural rotations assisted some sites in connecting to and identifying future employees. The rotations exposed students to the possibility of public health careers and facilitated recruitment, i.e., a "working interview" to benefit either the specific rotation site or for the community public health system.

Conclusion

In summary, the report findings overall demonstrate the positive impact of this multi-year endeavor by ILCHF, the two schools and the community partners in improving the delivery of oral health to children and underserved communities in Illinois. Both schools increased their services to children. With the new curriculum, a new generation of dentists have gained new understanding and skills to serve these underserved populations and incorporate serving them in a variety of manners within their practice. The projects not only furthered the mission and goals of the schools and the community health agencies, but also created and/or expanded enduring partnerships between the schools and the community health agencies focused on serving and expanding oral health care to children and training future dentists.

The results of this workforce development project furthered ILCHF commitment to improving the oral health of all children in Illinois. ILCHF continues to focus on pursuing the strategies of 1) strengthening and building the capacity of the oral health safety net system; 2) increasing the workforce/workforce development; and 3) increasing outreach/public education/awareness of children's oral health.

Finally, ILCHF looks forward to communicating with other stakeholders in the state of Illinois and the country about this work and these findings in ways that can guide work towards the goal for all children to have access to quality oral health services in their communities.

SECTION 1. DIRECT IMPACT ON CHILDREN*

Table 1.1.1

SIU EAST ST. LOUIS CLINIC: CHILDREN TREATED ANNUALLY

Time period	# of children treated aged < / = 12
Prior to grant period:	
July 2008—June 2009	1,035
Grant period:	
July 2009—June 2010	1,651
July 2010—June 2011	1,753
July 2011—June 2012	1,720
July 2012—June 2013	1,551
July 2013—June 2014	1,423
Grant period, 5 years:	
July 2009—June 2014	8,098
Average per year	1,620

Table 1.1.2

SIU EXTRAMURAL ROTATIONS AT FQHCS: ALL STUDENTS[1]

Time period	# patients treated
March—June 2012	136
July—December 2012	792
January—April 2013	257
May—June 2013	no data
July—December 2013	375
January—May 2014	364
Total	**1,924**

1. Includes Rural Scholars. Data compiled from SIU reports to ILCHF and internal SIU records.

Table 1.1.3

UIC ORAL HEALTH EDUCATION AND HEALTH PROMOTION AT CHICAGO PUBLIC SCHOOLS[1]

Academic year	CPS students (n)
Prior to grant period:	
2007/08	731
Grant period:	
2008/09	1,301
2009/10	800 *(est.)*
2010/11	1,609
2011/12	2,000 *(est.)*
2012/13	> 2,000 *(est.)*
Post-grant period:	
2013/14	2,611

1. 2008/09 includes 480 students from the Lessons in a Lunch Box program. UIC provided estimates for years that compiled data were not available.

Table 1.1.4

UIC ORAL HEALTH EDUCATION AND HEALTH PROMOTION[1]

Academic year	Give Kids A Smile Day	Health Fairs
Prior to grant period:		
2007/08	60	75
Grant period:		
2008/09	60	75
2009/10	60	75
2010/11	60	100
2011/12	60	100
2012/13	60	300
Total grant period	**300**	**650**
Post-grant period:		
2013/14	110	300

1. Additional programs for which data are unavailable include Mission of Mercy, Chicago Bears events and sealant programs.

SECTION 2. INFLUENCES ON STUDENTS

Incoming students

Table 1.2.1

DEMOGRAPHY

Variables	Categories	SIU (%)	UIC (%)	Total (%)
Race: SIU n=232; UIC n=262	Other	3.4	6.1	4.9
	Black/African American	2.6	8.8	5.9
	Hispanic/Latino	3.4	6.1	4.9
	White/Caucasian	83.2	54.2	67.8
	Asian/Native Hawaiian/ American Indian/Pacific Islander[1]	7.3	24.4	16.6
Sex: SIU n=184; UIC n=263	Male	56.5	49.8	52.6
	Female	43.5	50.2	47.4

1. Includes 'American Indian and Alaska Native'

Table 1.2.2

GROW UP LOCATION

Variables	Categories	SIU (%) n=231	UIC (%) n=263	Total (%) n=494
City or town classification	Large city or central urban area (over 200,000 people)	4.8	19.0	12.3
	Surburban area (town or village close to a large city)	23.4	55.1	40.3
	Small city (i.e. Rockford, IL) (between 50,000 and 200,000 people)	18.2	12.5	15.2
	Small town (under 50,000 people)	34.6	8.7	20.9
	Rural or unincorporated area	17.3	4.6	10.5

Table 1.2.3

STUDENTS INTERESTED IN GENERAL DENTISTRY

Variables	Categories	SIU (%) n=231	UIC (%) n=263	Total (%) n=494
Rank as a top professional interest at this time	Not selected	6.9	10.3	8.7
	First	74.0	58.6	65.8
	Second	10.0	14.4	12.3
	Third	6.9	14.4	10.9
	Selected, not ranked	2.2	2.3	2.2

Table 1.2.4

COMFORT TREATING PATIENTS IN A PUBLIC HEALTH SETTING

Variables	Categories	SIU (%) n=231	UIC (%) n=263	Total (%) n=494
Response	No	8.7	6.8	7.7
	Yes	91.3	93.2	92.3

Table 1.2.5

COMFORT TREATING CHILDREN

Variables	Categories	SIU (%) n=231	UIC (%) n=263	Total (%) n=494
Response	No	2.6	8.0	5.5
	Yes	97.4	92.0	94.5

Table 1.2.6

HOPE TO BECOME COMFORTABLE TREATING PATIENTS WITH SPECIAL NEEDS

Variables	Categories	SIU (%) n=88	UIC (%) n=262	Total (%) n=351
Level of agreement	Have not thought about it before	3.4	0.4	1.1
	Strongly agree	56.8	63.9	62.1
	Agree	36.4	27.8	29.9
	Neutral	3.4	5.3	4.8
	Disagree	0.0	1.1	0.9
	Strongly disagree	0.0	1.1	1.1

Table 1.2.7

VOLUNTARY DENTAL CARE

Variables	Categories	SIU (%) n=231	UIC (%) n=264	Total (%) n=495
Level of agreement	Have not thought about it before	2.2	1.1	1.6
	Strongly agree	53.2	56.1	54.7
	Agree	36.8	34.8	35.8
	Neutral	5.6	5.3	5.5
	Disagree	1.7	0.8	1.2
	Strongly disagree	0.4	1.9	1.2

Table 1.2.8

Variables	Categories	SIU (%) n=143
Level of agreement	Have not thought about it before	11.9
	Strongly agree	19.6
	Agree	34.3
	Neutral	26.6
	Disagree	4.9
	Strongly disagree	2.8

Graduating student survey

Table 1.2.9

ENVISIONING THEIR ENTIRE CAREER

Variables	Categories	SIU (%) n=149	UIC (%) n=181	Total (%) n=330
Public or private career	Primarily working in private practice	73.2	54.1	62.7
	Primarily working in public setting[1]	4.0	2.8	3.3
	Combination of private practice and public setting[2]	22.8	34.8	29.4
	Combination of private practice and teaching	—	8.3[3]	4.8

1. Defined as 'primarily working in a public health/community clinic/government setting'

2. Defined as 'working in a possible mixture of private practice and public health/community clinic/government service'

3. Includes 'other' category in percentage

Table 1.2.10

LOCATION OF PRACTICE

Variables	Categories	SIU (%) n=149	UIC (%) n=182	Total (%) n=331
Practice location	Urban	20.1	44.5	30.8
	Suburban	22.1	23.6	23.2
	Small town	24.2	4.9	11.2
	Rural	8.1	1.1	4.2
	Small city	20.1	6.0	6.3
	Mixture of locations[1]	0.7	8.8	16.0
	I have no plans yet	4.7	11.0	8.2

1. For UIC, includes 'small town and rural area', 'suburb and small town', and 'small city and small town'
   For SIU, includes 'urban and suburban'

Table 1.2.11

		Grew up location[1]					
Variables	**Categories**	**Urban (%)**	**Suburban (%)**	**Small town (%)**	**Rural (%)**	**Small city (%)**	**Mixture of locations[2] (%)**
Practice location	Urban	50.2	22.2	17.4	6.9	—	25.0
	Suburban	19.5	58.3	10.9	3.4	—	14.3
	Small town	10.1	13.9	32.6	44.8	—	7.1
	Rural	10.1	—	4.3	31.0	—	—
	Small city	10.1	—	28.3	10.3	—	46.4
	Mixture of locations[3]	0.0	—	—	—	—	3.6
	I have no plans yet	0.0	5.6	6.5	3.4	—	3.6

1. Percentages are based on column totals

2. For UIC, includes 'small town and rural area', 'suburb and small town' and 'small city and small town'
   For SIU, includes 'urban and suburban'

3. Includes: 'suburban and small town', 'urban and suburban', 'urban and small city', 'suburban small town,
   rural and I have no plans yet', 'suburban and I have no plans yet' and 'small city and small town'

Table 1.2.12

		Grew up location[1]					
Variables	**Categories**	**Urban (%)**	**Suburban (%)**	**Small town (%)**	**Rural (%)**	**Small city (%)**	**Mixture of locations[2] (%)**
Practice location	Urban	54.3	46.7	33.3	62.5	11.1	12.5
	Suburban	14.3	28.0	20.0	12.5	22.2	25.0
	Small town	5.7	0.9	26.7	—	—	25.0
	Rural	—	0.9	6.7	—	—	—
	Small city	8.6	1.9	6.7	12.5	44.4	—
	Mixture of locations[3]	8.6	9.3	6.7	—	—	25.0
	I have no plans yet	8.6	12.1	—	12.5	22.2	12.5

1. Percentages are based on column totals

2. For UIC, includes 'small town and rural area', 'suburb and small town' and 'small city and small town'
   For SIU, includes 'urban and suburban'

3. Includes: 'suburban and small town', 'urban and suburban', 'urban and small city', 'suburban small town,
   rural and I have no plans yet', 'suburban and I have no plans yet' and 'small city and small town'

Table 1.2.13

Variables	Categories	SIU (%) n=165	UIC (%) n=144	Total (%) n=306
Post-graduation location considerations	Location	66.7	37.0	50.8
	Financial	53.5	54.5	54.0
	Practice type, private	13.9	13.9	13.9
	Practice type, public	3.5	10.9	7.4
	Additional training	21.5	29.7	25.9
	Lifestyle	17.4	10.3	13.6
	Career/professional considerations[1]	57.6	60.0	58.9
	Other[2]	20.1	19.4	19.7

1. Includes: 'professional considerations, specialty', 'professional considerations, public health', and 'professional considerations, other'
2. Includes: 'time/hours', and 'other'

Table 1.2.14

Variables		Plan to treat economically disadvantaged		
		SIU (%)	UIC (%)	Total (%)
Plan to treat economically disadvantaged[1]	SIU=148, UIC=181	84.5	73.8	78.5
Plan to treat economically disadvantaged by career choice	Primarily working in private practice SIU=108, UIC=98	78.5	59.2	69.1
	Primarily working in public sector[2] SIU=6, UIC=5	100.0	100.0	100.0
	Combo of private and public[3] SIU=34, UIC=63	100.0	100.0	100.0
	Combo of private and teaching[3] UIC=11	—	54.5	54.5
	Other UIC=4	—	25.0	25.0

1. Percent represents only yes responses
2. Defined as 'primarily working in a public health/community clinic/government setting'
3. Defined as 'working in a possible mixture of private practice and public health/community clinic/government service'

Table 1.2.15

MEDICAID PATIENTS IN PRACTICE BY CAREER CHOICE[1]

| | | Plan on including Medicaid patients in practice | | |
| | | Yes (%) n=37 | Ambivalent (%) n=13 | No (%) n=53 |
Variables	**Categories**			
Career choice	Primarily working in private practice	28.4	14.9	56.7
	Primarily working in public setting	83.3	—	16.7
	Combination of private practice and public setting	43.3	10.0	46.7
	Other	—	—	—
	Combination of private practice and teaching	—	—	—

1. Data was only collected for SIU students

Table 1.2.16

TREATING CHILDREN IN FUTURE CAREER OR PRACTICE

Variables	**Categories**	SIU (%) n=149	UIC (%) n=183	Total (%) n=332
Plan to treat children	Yes	79.2	78.1	78.6

Table 1.2.17

TREATING CHILDREN FROM UNDERSERVED FAMILIES AND COMMUNITIES

| | | Plan to treat underserved | |
Plan to treat children *SIU: n=183 / UIC: n=149*	**Categories**	Yes (%) SUI/UIC/Total	No (%) SUI/UIC/Total
	Yes	70.3 / 63.7 / 66.7	8.8 / 14.8 / 12.1
	No	14.2 / 9.9 / 11.8	6.8 / 11.5 / 9.4

Table 1.2.18

ADEQUACY OF EXPOSURE AND/OR TRAINING IN PUBLIC HEALTH AND COMMUNITY SETTINGS

Variables	**Categories**	SIU (%) n=148	UIC (%) n=182	Total (%) n=330
Had adequate exposure and/or training	Strongly agree	41.2	42.9	42.1
	Agree	41.9	42.9	42.4
	Neutral	8.8	11.5	10.3
	Disagree	5.4	1.6	3.3
	Strongly disagree	2.7	1.1	1.8

Table 1.2.19

FEEL COMFORTABLE WORKING IN PUBLIC HEALTH AND COMMUNITY SETTINGS

Variables	Categories	SIU (%) n=148	UIC (%) n=188	Total (%) n=331
Feel comfortable	Strongly agree	42.6	48.6	45.9
	Agree	42.6	41.5	42.0
	Neutral	8.1	7.1	7.6
	Disagree	4.7	1.1	2.7
	Strongly disagree	2.0	1.6	1.8

Table 1.2.20

ADEQUACY OF EXPOSURE AND/OR TRAINING IN WORKING WITH CHILDREN

Variables	Categories	SIU (%) n=148	UIC (%) n=183	Total (%) n=331
Had adequate exposure and/or training	Strongly agree	51.4	38.8	44.4
	Agree	36.5	46.4	42.0
	Neutral	6.8	8.7	7.9
	Disagree	2.0	4.9	3.6
	Strongly disagree	3.4	1.1	2.1

Table 1.2.21

FEEL COMFORTABLE WORKING WITH CHILDREN

Variables	Categories	SIU (%) n=148	UIC (%) n=183	Total (%) n=331
Feel comfortable	Strongly agree	42.6	38.8	44.4
	Agree	40.5	46.4	42.0
	Neutral	8.8	8.7	7.9
	Disagree	4.7	4.9	3.6
	Strongly disagree	3.4	1.1	2.1

SECTION 3. IMPACT ON ALUMNI

UIC alumni select tables and charts

Table 1.3.1

POPULATIONS REPRESENTED IN CLINICAL EDUCATION (2009–2014)

Patient type	% students
Pediatric	99%
Infants/toddlers	80%
Special needs	84%
Developmentally disabled	71%
Physically disabled	79%
Medicaid	100%
Racial/ethnic minorities	99%
HIV/AIDS	90%
Pregnant	85%
Homeless	54%
Diabetic	97%
Non-English speakers	97%
Geriatric	91%

Figure 1.3.1

POST-GRADUATE ENTRY DECISION FACTORS (2009–2014)[1]

Factor	%
Type of client	67%
Work with children	32%
Work with the underserved	28%
Work in public health	17%
Debt	79%
Salary	78%
Benefits	54%
Family/spouse	68%
Desire to run business	32%
Aversion to run business	28%

1. Ranking as Very Important or Important

Table 1.3.2

MAIN FACTORS IN CHOOSING PRACTICE OR POST-GRAD LOCATION (2009–2014)[1]

	% of students (n)	
Lifestyle	71%	(n=84)
Family/spouse	28%	(n=34)
Location and metropolitan	43%	(n=52)
Location	31%	(n=37)
Metropolitan	13%	(n=15)
Professional	43%	(n=52)
Career	26%	(n=31)
Clientele	12%	(n=14)
Grad program	6%	(n= 7)
Compensation	4%	(n= 5)
TOTAL N		120

1. Percentages exceed 100% because some individuals specified more than one reason.

Table 1.3.3

PROVIDING CARE TO UNDERSERVED POPULATIONS IN CURRENT PRACTICE (2009–2014)

	% of students (n)	
Pediatric	93%	(n=123)
Medicaid	63%	(n= 83)
Physically/developmentally disabled	81%	(n=126)
Racial/ethnic minorities	98%	(n=130)
Medicare	31%	(n= 39)

Table 1.3.4

HOURS SPENT DOING PRO BONO CARE IN PAST THREE MONTHS (2009–2014)[1]

	% of students (n)	
0 hours	50%	(n=65)
> 0 hours	50%	(n=64)
Average hours *(all respondents)*	5.4 hours	
Average hours *(only those who provided care)*	12.9[1] hours	
Range of hours	0–200 hours	

1. Excluding the outliers of 60 hours (2009) and 200 hours (2012), the average hours providing care is 9.1 hours.

Table 1.3.5

VOLUNTEERISM BY ACTIVITY TYPE IN PAST YEAR: DENTAL CARE VS. EDUCATION (2009–2014)

	% of students (n)	
Dental care *(adults or children)*	43%	(n=56)
Oral health education *(children)*	52%	(n=68)
Both education and dental care	31%	(n=40)
Any volunteer activity *(either education or dental care)*	64%	(n=84)

Table 1.3.6

PERCENT ACCEPTING PEDIATRIC PATIENTS BY AGE IN MONTHS (2009–2014) % (n)[1]

	0–5 months	6 months	7–11 months	12 months	17–18 months	24 months	36–60 months	≥ 72 months
% accepted per period	16% (20)	27% (35)	6% (8)	20% (26)	20% (2)	7% (9)	13% (17)	9% (12)
% cumulative	16% (20)	43% (55)	49% (63)	69% (89)	71% (91)	78% (100)	91% (117)	100% (129)

NOTE: Discontinuities in the ages specified above are because no respondent specified an age in any other time period.

1. Did not reply: 2010: (n=1), 2011: (n=5), 2013: (n=3)

Table 1.3.7

PEDIATRIC PATIENTS REFERRED BASED ON HYPOTHETICAL SCENARIO (2009–2014)

	% of students (n)	
Endodontic cases	63%	(n= 81)
Orthodontic cases	89%	(n=116)
Behavioral problems	79%	(n=103)
Mentally disabled	43%	(n= 55)
Physically disabled	34%	(n= 44)
HIV +	11%	(n= 14)
Multiple health problems	55%	(n= 72)
Difficult parents	47%	(n= 61)

SECTION 4. IMPACT ON FACULTY

Table 1.4.1

FACULTY REPORTING HAVING ANY KNOWLEDGE OF EXTRAMURAL EDUCATION'S IMPACT ON STUDENTS[1]

	SIU	UIC	Both schools
No knowledge reported	56% (n=10)	46% (n=11)	50% (n=21)
Yes, had knowledge	44% (n=8)	54% (n=13)	50% (n=21)
1 factor	6% (n=1)	0	2% (n=1)
2 factors	0	0	0
3 factors	0	13% (n=3)	7% (n=3)
4 factors	17% (n=3)	4% (n=1)	10% (n=4)
5 factors	22% (n=4)	0	10% (n=4)
6 factors	0	4% (n=1)	2% (n=1)
7 factors	0	33% (n=8)	19% (n=8)
8 factors	0	0	0

1. NO KNOWLEDGE = replied by marking "no basis for comment" or did not reply to the question

SIU, 6 RESPONSE OPTIONS: clinical skills, patient interaction, behavior management, professionalism, attitudes about community service, other

UIC, 8 RESPONSE OPTIONS: clinical skills, patient interaction and communication skills, behavior management skills, professionalism, critical thinking and problem solving skills, cultural competency, productivity, other

Table 1.4.2

FACULTY EXPERIENCES WITH COMMUNITY-BASED AND EXTRAMURAL EDUCATION PROGRAMS[1]

	SIU Clinical Faculty	UIC Clinical Faculty	Both schools
Informal discussions with other faculty	61% (n=11)	58% (n=14)	60% (n=25)
Informal discussions with students	72% (n=13)	54% (n=13)	62% (n=26)
Formal discussions at faculty meetings	50% (n=9)	n/a	50% (n=9)
Dental school newsletters, memos, or bulletins	44% (n=8)	46% (n=11)	45% (n=19)
Supervision of students on campus who were in programs	28% (n=5)	17% (n=4)	21% (n=9)
Visited one of the extramural program sites	n/a	29% (n=7)	29% (n=7)
UIC COD annual extramural conference	n/a	21% (n=5)	21% (n=5)
Other[2]	6% (n=1)	4% (n=1)	5% (n=2)

1. SURVEY RESPONSES, CLINICAL FACULTY: SIU = 18, UIC = 24. n/a = not asked on the survey

2. OTHER: SIU = Impact of program on other courses. UIC = Have a grant linked to program and direct another.

Table 1.4.3

EXTRAMURAL EDUCATION RELATION TO COD MISSION

	UIC Faculty	SIU Faculty	Total
Supports	90% (n=19)	100% (n=16)	95% (n=35)
Irrelevant	0	0	0
Conflicts with	10% (n=2)	0	5% (n=2)

Appendix II. LOGISTIC REGRESSION

SECTION 1. CROSS-SECTIONAL MODELS[1]

Table 2.1.1

SIU INDIVIDUAL MODEL

Variable (name in data)	Pro Bono Model		Pediatric Model	
	Exp (B)	Sig.	Exp (B)	Sig.
Gender *(FemaleDummy)*	1.590	0.528	0.296	0.157
Race: White *(WhiteOrNonWhiteDummy)*	0.856	0.859	0.356	0.282
Public health curriculum quality *(PHAdeqComfortCombinedDummy)*	8.690	0.001	—	—
Pediatric curriculum quality *(CHILDAdeqComfortCombinedDummy)*	—	—	31.621	0.000
Envision volunteering *(EnvisionVolunteerDummy)*	—	—	8.851	0.008
Future practice location *(NotSuburbPracticeLocationDummy)*	2.051	0.321	2.510	0.250
Constant	0.915	0.904	0.134	0.029

1. Two dependent variables were modeled, the first for economically disadvantaged populations (Pro Bono Model), and the second for intention to work with children (Pediatric Model).

Table 2.1.2

UIC INDIVIDUAL MODEL

Variable (name in data)	Pro Bono Model		Pediatric Model	
	Exp (B)	Sig.	Exp (B)	Sig.
Gender *(FemaleDummy)*	1.977	0.085	1.041	0.931
Race: Asian[2] *(AsianOtherDummy)*	1.042	0.930	0.838	0.739
Race: Black or Latino[2] *(BlkLatinoDummy)*	5.005	0.082	0.818	0.796
Pediatric curriculum quality *(CHILDAdeqComfortCombinedDummy)*	—	—	9.631	0.000
Public health curriculum quality *(PHAdeqComfortCombinedDummy)*	8.086	0.000	—	—
Envision volunteering *(EnvisionVolunteerDummy)*	—	—	3.529	0.007
Number of rotation days *(RotationDaysContinuous)*	0.980	0.030	1.000	0.968
Future practice location *(NotSuburbPracticeLocationDummy)*	1.179	0.678	0.847	0.731
Constant	0.977	0.977	0.392	0.323

2. Dummy variable; 'white' category used as baseline

Table 2.1.3

Variable (name in data)	Pro Bono Model		Pediatric Model	
	Exp (B)	Sig.	Exp (B)	Sig.
Gender *(FemaleDummy)*	1.845	0.068	0.700	0.367
Race: White *(WhiteOrNonWhiteDummy)*	1.266	0.531	0.744	0.477
Grow up location *(NotSuburbGrowUpDummy)*	1.590	0.166	1.340	0.475
Pediatric curriculum quality *(CHILDAdeqComfortCombinedDummy)*	—	—	4.582	0.000
Public health curriculum quality *(PHAdeqComfortCombinedDummy)*	5.012	0.000	—	—
Envision volunteering *(EnvisionVolunteerDummy)*	—	—	13.606	0.000
Future practice location *(NotSuburbPracticeLocationDummy)*	1.286	0.456	1.233	0.604
Constant	0.493	0.114	0.223	0.006

SECTION 2. PRE-POST MODELS

Table 2.2.1

Variable (name in data)	Coefficient Estimates	
	Exp (B)	Sig.
Gender *(FemaleDummy)*	1.688	0.194
Race: White *(WhiteOrNonWhiteDummy)*	0.546	0.164
Grow up location *(NotSuburbGrowUpDummy)*	1.345	0.463
Consider having a career in a public health setting: incoming *(PublicOrMixturePracticeDummy_Inc)*	—	—
Public health curriculum quality: graduating *(AdeqComfortPH_Exit)*	2.436	0.047
Constant	0.462	0.455

Table 2.2.2

Variable (name in data)	Coefficient Estimates	
	Exp (B)	Sig.
Gender *(FemaleDummy)*	0.778	0.573
Race: White *(WhiteOrNonWhiteDummy)*	1.150	0.782
Envision volunteering: incoming *(EnvisionVoluntaryCareDummy_Inc)*	3.242	0.011
Pediatric curriculum quality *(AdeqComfortCHILD_Exit)*	6.101	0.000
Plan on specializing: graduating *(GeneralORSpecialty_Exit)*	—	—
Future practice location *(NotSuburbPracticeLocationDummy)*	1.858	0.167
Constant	0.190	0.083

Table 2.2.3

Variable (name in data)	Coefficient Estimates	
	Exp (B)	Sig.
Gender *(FemaleDummy)*	0.589	0.156
Race: White *(WhiteOrNonWhiteDummy)*	1.422	0.426
Grow up location *(NotSuburbGrowUpDummy)*	4.759	0.000
Public health curriculum quality *(AdeqComfortPH_Exit)*	2.832	0.022
Pediatric curriculum quality *(AdeqComfortCHILD_Exit)*	—	—
Plan on specializing: graduating *(GeneralORSpecialty_Exit)*	3.146	0.053
Constant	0.020	0.001

SECTION 1. STUDY DESIGN

This is a case study of a workforce development program at two Illinois dental schools. The study utilized both outcome and process measures. The research design followed a community based participatory research model and utilized a mixed methods approach that relied on both quantitative and qualitative data. The objectives of the study and the overarching research questions were determined jointly between ILCHF, SIU and UIC in collaboration with CURL. Research questions were similar for both schools, but were designed to reflect each school's unique programs. As is common with community-based participatory research, Loyola took the lead in designing the instruments, but both schools participated in the process. CURL researchers developed initial research instruments and submitted them to each school for input. The research instruments continued to be refined in collaboration with each school until all parties agreed to the instruments and protocols[9]. A study timeline was constructed and approved by all parties.

The research design aimed to include multiple perspectives, i.e. students, alumni, faculty, dental school leadership and extramural site preceptors and leaders. The study included various approaches such as surveys, interviews, focus groups, observations and analysis of administrative data. Some components recurred annually, while other components were implemented once. Planning for the research project commenced in the fall of 2008. Data collection commenced in 2009 and was completed in 2016. Feedback reports to the ILCHF and the school partners occurred throughout the project.

SECTION 2. THE RESEARCH QUESTIONS

ADMISSIONS PROCESS

Both SIU and UIC: Do changes in attitudes and policies with regard to recruitment and admissions increase the number of enrolled students interested in community-based and/or pediatric dentistry?

SIU: How did the Rural Scholars selection process proceed?

UIC: What was the impact of the admissions process on incoming classes?

Data Sources
SIU: Admissions committee members' interviews, Rural Scholars individual and group interviews, Dr. Poonam Jain's (SIU Rural Scholars Program Director) minutes from a meeting with potential Rural Scholars who did not apply to the program and incoming student surveys.

UIC: Admissions committee members' focus group, admissions department administrators' focus group and incoming student surveys.

---

9   *The Loyola IRB reviewed and declared the research exempt. The surveys and other data administered by the school were submitted to each school's IRB and approved.*

IMPACT OF THE CURRICULUM ON STUDENTS

Both SIU and UIC: How do the new curriculum and resulting field experiences impact the beliefs, attitudes, and preferences of dental students with regard to community-based practice and pediatric dentistry?

Data Sources

SIU: Incoming student surveys, graduating student surveys, third and fourth year dental student focus groups and fourth year student interviews

UIC: Incoming student surveys, graduating student surveys, alumni surveys, fourth year dental student focus groups and fourth year dental student reflective seminar observations

ORGANIZATIONAL CHANGE

Both SIU and UIC: How do political, organizational and cultural factors shape and influence a shift towards a public health perspective in dentistry education? To what extent are these factors important to establishing the permanency of this project?

Data Sources

SIU: Faculty survey, key faculty interviews and dental school leadership interviews

UIC: Faculty survey, key faculty interviews and dental school leadership interviews

EXTRAMURAL PARTNERSHIPS

Both SIU and UIC: What factors lead to strengthened partnerships between community clinics and dental schools? What factors negatively influence these partnerships? Are there any mitigating factors in the relationship?

Data Sources

SIU: Extramural site administrator interview and debriefing interviews with pediatric dentist and Dr. Jain

UIC: Extramural site leader and preceptor interviews, annual preceptor meeting observations and debriefing interview with Dr. Evans

WORKFORCE OUTCOMES

Both SIU and UIC: To what extent has this project influenced recent dental school graduates in their choice of practice as a result of their experiences with this project? Are there other ways (attitudinal/behavioral) in which experiences with this project have influenced recent dental school graduates with regard to community-based practice and pediatric dentistry?

Data Sources

Both SIU and UIC: Longitudinal data from incoming student, graduating student and alumni surveys

IMPACT ON CHILDREN[10]

Both SIU and UIC: What was the direct impact of the curricular changes on children?

Data Sources

SIU: Administrative data regarding appointments at the East St. Louis clinic and student rotation experiences at FQHCs

UIC: Administrative data regarding oral health education and screenings at Chicago public schools and other community sites, UIC estimates of children receiving care by UIC students at extramural sites and an estimate by one extramural site executive director of the impact on their clinic.

SECTION 3. TYPES OF DATA

This study used a mixed methods approach. Quantitative methods included surveys and administrative data. Qualitative data methods included one-on-one interviews, group interviews, focus groups and observations at seminars and meetings. In almost all cases, qualitative data was collected on site by Loyola research staff. The exceptions include interviews that were conducted with extramural site leaders and preceptors for SIU and UIC, as well as final debriefing interviews at SIU. These were completed over the phone. Any exceptions are noted in the discussion below.

Quantitative data

STUDENTS

Incoming students
Surveys of incoming students were conducted by SIU for the classes of 2013–2017 and by UIC for the classes of 2013–2016. Surveys were completed at the beginning of students' first year of dental school.[11] At SIU, 232 out of 251 incoming students completed surveys, for a response rate of 92%. At UIC, 264 out of 271 incoming students completed surveys, for a response rate of 97%. These surveys were completed in hard copy form.

Graduating students
Graduates from SIU classes of 2009–2015[12] and from UIC classes of 2009–2013[13] completed exit surveys around the time of graduation. At SIU, 288 out of 327 graduates completed exit surveys, for a response rate of 88%. At UIC, 237 out of 258 graduates completed exit surveys, for a response rate of 92%. Surveys were completed in hard copy form. One less year of exit data collection was planned for UIC than for SIU because UIC began implementing the main portions of the ILCHF grant a year earlier than at SIU.

---

10 *Not an original research question. At conclusion of study, ILCHF requested that it be coded and evaluated.*

11 *Due to a misunderstanding of the implementation process at SIU, the incoming student survey was implemented at the beginning of the second year of dental school with the class of 2013.*

12 *At SIU, data for the classes of 2019–2011 were provided to Loyola in aggregate form rather than case level.*

13 *Exit data for UIC class of 2014 was collected in conjunction with the alumni survey roughly a year after graduation.*

UIC also provided Loyola research staff with information about the number of days individual students actually spent in extramural rotations annually from 2007–2014. The number of days in rotations was matched to students' study ID numbers.

Alumni

Alumni surveys were implemented by UIC alumni from the classes of 2009–2014 and were designed to be conducted approximately two years after students had graduated. The survey was implemented in 2012–2016. The first two years served as a pilot of the process, and surveys were implemented in both hard copy and online formats in order to obtain a higher response rate. Beginning with the class of 2011, the survey was implemented solely in an online format. In addition, beginning in 2011, UIC was unable to obtain contact information for all graduates. One hundred thirty-seven graduates out of 383 completed the survey for a completion rate of 36%.

An Alumni survey had been planned for SIU as well, but was not implemented. The UIC alumni survey however, showed that alumni provided very similar responses on key outcome measures after graduation as they did at the time that they graduated.

Table 1

STUDENT RESPONSE FREQUENCIES

Class	SIU		UIC		
	Incoming	Exit	Incoming	Exit	Alumni
2009	–	28*	–	-	30
2010	–	44*	–	53	29
2011	–	51*	–	60	28
2012	–	44	–	60	22
2013	45	15	67	64	14
2014	44	46	66	14	14
2015	44	44	65	–	–
2016	51	–	66	–	–
2017	48	–	–	–	–
Response Rate	92%	88%	97%	92%	36%

*Data provided only in aggregate form

ANALYSIS OF STUDENT DATA

Descriptive statistics

Data was entered into SPSS databases and codes were assigned for each variable. Free response questions were coded based on overall trends. A descriptive analysis was conducted on these data primarily by examining trends in frequency distributions.

Logistic regression

In addition to the descriptive analysis, two series of regression studies were conducted to assess the curriculum's impact on students' attitudes and career preferences. The first used only cross-sectional data from the exit survey. This was implemented for the classes of 2011–2014 for both schools. Sample sizes for the cross-sectional analysis were: 105 at UIC and 198 at SIU. The second study combined student data from the incoming and exit surveys into a new pre-post database. For both schools, longitudinal data was gathered for incoming and graduating classes of 2013 and 2014 and was collected for an additional year (2015) from SIU. The number of observations from each school were: 89 at SIU and 73 at UIC.

The outcomes of most interest for this study were students' attitudes towards treating children and underserved adult populations. The significance and effect size of the chosen predictor variables to these outcomes can be seen in appendix II. These attitudes were measured on simple scales with values of 1 to 4, where 4 indicated the most positive attitude. The scales were recoded to "dummy" variables, where 0 indicated a neutral or negative attitude and 1 indicated a positive attitude. For these dichotomous outcome variables, logistic regression models were used to assess which of a set of background variables and educational experiences were associated with a positive attitude. Most of those predictor variables were also recoded into dummy variable formats.

A range of predictor variables from the survey were considered in the model-building process. These variables are listed in the table on the next page. Some were unique to the models of a particular school or the joint school models. These variables were tested for inclusion in the end models, but only those that had a significant relationship to the dependent variable were kept in the model.

SECTION 4. LOGISTIC VARIABLES USAGES

Cross-sectional model

Variable (name in data)	Variable Description	Pro-Bono Model SIU/UIC Combined	Pediatric Model SIU/UIC Combined
Gender *(FemaleDummy)*	1 'Male' 2 'Female'	X / X / X	X / X / X
Race: White *(WhiteOrNonWhiteDummy)*	0 'Not White' 1 'White'	X / – / X	X / – / X
Race: Asian *(AsianOtherDummy)*	0 'Not Asian/Other race' 1 'Asian/Other race' REMARK: Dummy variable, calculated in reference to 'white category'	O / X / O	O / X / O
Race: Black or Latino *(BlkLatinoDummy)*	0 'Not Black/Latino race' 1 'Black/Latino race' REMARK: Dummy variable, calculated in reference to 'white category'	O / X / O	O / X / O
Grow up location *(NotSuburbGrowUpDummy)*	0 'Suburban' 1 'Not Suburban'	O / O / X	O / O / X
Adequate training with children *(AdeqTrainExpChildrenDummy)*	1 'No' 2 'Yes' REMARK: Dichotomous levels were recoded from respondents levels of agreement to statement: "had adequate training working with children". 'Strongly agree' and 'agree' were recoded as 'yes'; all others were recoded as 'no'.	– / – / –	O / – / O
Comfort working with children *(ComfortChildrenDummy)*	1 'No' 2 'Yes' REMARK: Dichotomous levels were recoded from levels of agreement with "feel comfortable working in public health". 'Strongly agree' and 'agree'were recoded as 'yes'; all others were recoded as 'no'.	– / – / –	O / – / O
Pediatric curriculum quality *(CHILDAdeqComfortCombinedDummy)*	1 'No' 2 'Yes' REMARK: If student answered 'yes' to the previous two questions, this combined variable was coded as 'yes'; otherwise it was coded 'no'.	– / – / –	X / X / X
Adequate training in public health *(AdeqTrainExpPubHlthDummy)*	1 'No' 2 'Yes' REMARK: Dichotomous levels were recoded from levels of agreement with "had adequate training in a public health setting". 'Strongly agree' and 'agree' were recoded as 'yes'; all others were recoded as 'no'.	O / O / O	– / – / –

X *VARIABLE was used in final model*

O *VARIABLE was tried but not used in final model*

— *VARIABLE was not appropriate/did not apply to this model*

Cross-sectional model, *continued*

Variable (name in data)	Variable Description	Pro-Bono Model SIU/UIC Combined	Pediatric Model SIU/UIC Combined
Comfort working in public health *(ComfortPubHlthDummy)*	1 'No' 2 'Yes' REMARK: Dichotomous levels were recoded from levels of agreement with "feel comfortable working in public health". 'Strongly agree' and 'agree' were recoded as 'yes'; all others were recoded as 'no'.	O / O / O	– / – / –
Public health curriculum quality *(PHAdeqComfortCombinedDummy)*	1 'No' 2 'Yes' REMARK: If student answered 'yes' to the previous two questions, this combined variable was coded as 'yes'; otherwise it was coded 'no'.	O / X / X	– / – / –
Envision volunteering *(EnvisionVolunteerDummy)*	1 'No' 2 'Yes' REMARK: Dichotomous levels were recoded from levels of agreement towards volunteering. 'Strongly agree' and 'agree' were recoded as 'yes'; all others were recoded as 'no'.	– / – / –	X / X / X
Number of rotation days *(RotationDaysContinuous)*	Continuous numeric variable for number of rotation days.	– / X / –	– / X / –
Rotation days: high *(RotationDaysHiDummy)*	1 'No' 2 'Yes' REMARK: 'yes' if students completed 80 or more rotation days, 'no' otherwise. This is a dummy variable with reference to moderate number of rotation days (between 45 and 80 days).	– / O / –	– / O / –
Rotation days: low *(RotationDaysLoDummy)*	1 'No' 2 'Yes' REMARK: 'yes' if students completed 45 or less rotation days, 'no' otherwise. This is a dummy variable with reference to moderate number of rotation days (between 45 and 80 days).	– / O / –	– / O / –
SIU cares *(RotationDaysLoDummy)*	1 'No' 2 'Yes' REMARK: 'yes' if student was an SIU cares scholar, 'no' otherwise.	O / – / –	O / – / –
Future practice location *(NotSuburbPracticeLocationDummy)*	0 'Suburban' 1 'Not Suburban' If student indicated they plan to practice in a suburban location in "future practice location" variable was coded 'suburban'; otherwise variable was coded 'not suburban'.	X / X / X	X / X / X

X *VARIABLE was used in final model*

O *VARIABLE was tried but not used in final model*

— *VARIABLE was not appropriate/did not apply to this model*

Longitudinal model [1]

Variable (name in data)	Variable Description	Pro Bono Model	Pediatric Model	Practice Location Model
Gender *(FemaleDummy)*	1 'Male' 2 'Female'	X	X	X
Race: White *(WhiteOrNonWhiteDummy)*	0 'Not White' 1 'White'	X	X	X
Grow up location *(NotSuburbGrowUpDummy)*	0 'Suburban' 1 'Not Suburban'	X	O	X
Interest in public health: incoming *(PublicHealthInterestDummy_Inc)*	1 'No' 2 'Yes' Recoded variable from ranking top professional interests, 'yes' if public health was ranked in top 3 professional interests; 'no' otherwise.	O	—	O
Comfort working in a public health setting: incoming *(ComfortPublicHealthDummy_Inc)*	1 'No' 2 'Yes' Recoded from levels of agreement with "feel comfortable working in public health". 'Stronglyagree' and 'agree' were recoded as 'yes'; all others were recoded as 'no'.	—	O	O
Consider having a career in a public health setting: incoming *(PublicOrMixturePracticeDummy_Inc)*	1 'Primarily public or mixture' 2 'Primarily private' If public health was included in future plans, variable was coded 'primarily public or mixture'; if not, variable was coded 'primarily private'.	O	—	O
Public health curriculum quality *(AdeqComfortPH_Exit)*	1 'No' 2 'Yes' If student answered 'yes' to the "feel comfortable in a public health setting" and to having "adequate training in a public health setting", variable was coded as 'yes'; if they answered 'no' to either one, variable was coded'no'.	—	O	O
Interest in treating children: incoming *(Pediatric_Incoming_Interest_Inc)*	1 'No' 2 'Yes' Recoded variable from ranking top professional interests; 'yes' if pediatric dentristry was ranked in top 3 professional interests; 'no' otherwise.	O	—	O
Comfort treating children: incoming *(ComfortChildrenDummy_Inc)*	1 'No' 2 'Yes' Dichotomous levels were recoded from levels of agreement with "feel comfortable working in public health". 'Strongly agree' and 'agree'were recoded as 'yes'; all others were recoded as 'no'.	O	X	O

1 Data from both schools are combined for these models

X *VARIABLE was used in final model*

O *VARIABLE was tried but not used in final model*

— *VARIABLE was not tried*

Longitudinal model, *continued*

Variable (name in data)	Variable Description	Pro Bono Model	Pediatric Model	Practice Location Model
Envision volunteering: incoming *(EnvisionVoluntaryCareDummy_Inc)*	1 'No' 2 'Yes' Dichotomous levels recoded from levels of agreement towards "providing uncompensated dental care". 'Strongly agree' and 'agree' were recorded as 'yes'; all others were recoded as 'no'. (Incoming)	O	O	O
Envision volunteering: graduating *(EnvisionVoluntaryCareDummy_Exit)*	1 'No' 2 'Yes' Dichotomous levels recoded from levels of agreement towards "providing uncompensated dental care". 'Strongly agree' and 'agree' were recorded as 'yes'; all others were recoded as'no'. (Graduating)	X	—	X
Pediatric curriculum quality *(AdeqComfortChild_Exit)*	1 'No' 2 'Yes' If student answered 'yes' to "feel comfortable treating children" and to having "adequate training treating children", variable was coded as 'yes'; if they answered 'no' to either one, variable was coded 'no'. (Graduating)	—	X	O
Plan on specializing: graduating *(GeneralORSpecialty_Exit)*	1 'General' 2 'Special' 5 'No plans' Did students plan on going into general dentristry or a specialization? (Graduating)	O	O	X
Future practice location *(NotSuburbPracticeLocationDummy)*	0 'Suburban' 1 'Not Suburban'	O	X	—
Consider financial factors *(ConsiderFINANCES)*	1 'No' 2 'Yes' Did students consider financial factors in making post-graduate plans?	—	—	O
Consider future career *(ConsiderCAREER)*	1 'No' 2 'Yes' Did students consider future career in making post-graduate plans?	—	—	O
Consider lifestyle factors *(ConsiderLIFESTYLE)*	1 'No' 2 'Yes' Did students' lifestyle factors in making post-graduate plans?	—	—	O

X *VARIABLE was used in final model*

O *VARIABLE was tried but not used in final model*

— *VARIABLE was not tried*

CLINICAL FACULTY

Clinical faculty at both schools were surveyed about their knowledge and experiences of extra-mural education programs. At SIU, the survey was implemented in hard copy form at a mandatory faculty retreat in 2014. Thirty-nine out of 47 clinical faculty attended the retreat and 18 completed the survey, resulting in a response rate of 46% of those who attended the retreat and 38% overall. Faculty at UIC were surveyed about their knowledge and experiences in regard to extramural education programs in an online format in 2015. Twenty-four clinical faculty responded to the survey out of 202 clinical faculty, for a response rate of 12%.

ANALYSIS OF FACULTY DATA

Descriptive statistics

Faculty data was analyzed in a similar fashion to student data. Categorical data was entered into SPSS and coded. Free response questions were coded based on overall trends. A descriptive analysis was conducted on these data primarily by examining trends in frequency distributions.

PEDIATRIC PATIENTS

SIU submitted reports to ILCHF with administrative data that was analyzed by Loyola research staff. This included pediatric appointment data for the East St. Louis Clinic from July 2008 – June 2014. These reports included information about the number of appointments made and the number of children treated. SIU's reports to ILCHF also included data about the number of patients that were treated by SIU students at FQHCs during extramural rotations, most of which were children. In general, this data was reported on a monthly basis, but in some cases it was reported on a semi-annual basis. This data was available for most months from March 2012 – June 2014.

UIC estimated that during the grant period, students provided care to more than 30,000 children at extramural sites. UIC provided this information to Loyola research staff by calculating the number of patients for whom students provided care in the 2015/16 academic year multiplied by an estimate of the percentage of pediatric patients at each site.

In their reports to ILCHF, UIC provided annual information about students' oral health education and health promotion activities at Chicago public schools, community health fairs and other venues for 2007-2014. In some cases, UIC had an actual count. In other cases, UIC estimated the number of children who were served. Loyola researchers received this information from UIC.

ANALYSIS OF PEDIATRIC DATA

Descriptive statistics

Data analysis was limited to looking at frequency trends from reports given to Loyola.

Qualitative data

STUDENTS

Rural scholars

The Rural Scholars Program was only implemented at SIU. Rural Scholars' experiences were assessed using individual and group interviews. Interviews were conducted annually beginning with the 2010/11 academic year and concluded in the 2014/15 academic year. During this time, the equivalent of 53 student interviews were completed. When individual interviews were not possible, group interviews were conducted. In the years when it seemed Rural Scholars might have comments that they did not want to share with their classmates, a group interview was followed by very brief individual interviews to allow for the sharing of confidential information. Interviews were recorded and transcribed.

An additional source of qualitative data about students came from Dr. Jain's notes from three debriefing interviews conducted with students who had been eligible to apply to the Rural Scholar Program, but had not applied.

EXTRAMURAL EXPERIENCES

SIU

Students' extramural experiences at SIU were assessed primarily using focus groups with students who had completed extramural rotations. In addition to focus groups, individual and group interviews were added when necessitated by scheduling constraints. Between 2012 and 2015, 24 students had participated in this component. Initially, only fourth year dental students participated in the assessment. When the extramural rotations shifted to the third year of dental school, third year students were also assessed. In the first year of the implementation of this component, field notes were written. In subsequent years, focus groups and interviews were recorded and transcribed. In 2012 and 2013, some of the interviews were conducted at the FQHCs while students were on rotation but were not busy. This allowed for informal observations of students' activities at extramural sites. Most of the focus groups were conducted at SIU.

UIC

The primary source of qualitative data about UIC students' experiences with extramural rotations was from observations of fourth year students' reflective seminars. Field notes were taken at these meetings. 30 seminars were observed between 2009 and 2013. Due to a miscommunication, the last spring 2010 seminar was not observed. Instead, Loyola researchers were provided with 16 student essays about students' extramural experiences that year.

In order to obtain more specific information about students' experiences of extramural rotations and the impact of the rotations, two focus groups were held with fourth year students. Six students participated in the 2013 focus group and nine students participated in the 2015 focus group. Field notes were taken during these sessions.

ADMISSIONS AND KEY FACULTY

SIU

Two SIU admissions committee members were interviewed individually in 2010. These interviews were recorded and transcribed. In 2010, interviews were also conducted with four key faculty members and were also recorded and transcribed. In 2015, final and debriefing interviews were conducted with three faculty members and one dean. One of these faculty interviews was conducted in East St. Louis, while the remaining 2015 interviews were conducted over the phone.

Individual interviews were conducted with seven key faculty members during the 2010/11 academic year. These seven interviews included three interviews with managing partners. In addition, during that same year, a group interview was conducted with two UIC senior deans who preferred to be interviewed together. In 2016, one final debriefing interview was conducted with a program dean. Interviews were recorded and transcribed.

UIC

UIC's admissions system and process was assessed with two focus groups in 2013. One group was composed of 10 faculty admissions committee members, while the second group was composed of three admissions department leaders and administrators.

EXTRAMURAL PARTNERS

SIU

SIU had one primary extramural partner, the Southern Illinois Healthcare Foundation (SIHF), which is an umbrella organization for several FQHCs in the region. We interviewed one extramural site administrator over the phone in 2015 about SIHF's experience with the rotations.[14]

UIC

The experiences of UIC's extramural partners were assessed through interviews and observations at annual meetings at the dental school. UIC held annual meetings for their extramural partners' leadership and preceptors. Loyola research staff observed these sessions and took field notes annually from 2009–2013 except for 2010 due to a miscommunication.

Interviews were also conducted with at least one representative from each of UIC's extramural partners. Pilot interviews were first conducted at three sites with extramural leaders and preceptors, and field notes were taken during these sessions. These pilot interviews enabled Loyola researchers to develop an instrument for the broader extramural study. This instrument was used to conduct phone interviews with 15 leaders and preceptors.

DATA CODING AND ANALYSIS

Qualitative data were coded using two methods; a top-down and bottom-up approach. For the top-down approach, the data were examined in relation to previously identified themes that were the primary issues of interest such as pediatric dentistry, public health dentistry, implementation, student experiences, impact on the community, etc. These themes were based on the research questions and the central issues that were being examined in relation to each data type.

---

14 Field notes were taken during the interview.

The qualitative data were coded for these themes and the data were further analyzed within each of these categories to identify the dimensions of each of the relevant themes. For the bottom-up approach, the data were examined for the individual meanings to respondents and any other issues that were important to them. This allowed for unexpected information to emerge from the data such as how uncertainty about a new academic program impacted students' experience of the program and their learning and attitudes about a specific underserved population.

SECTION 5. DATA MANAGEMENT

QUANTITATIVE DATA

Survey data was entered into SPSS databases. During the data analysis process, additional data integrity checks were made. For surveys that were implemented as online surveys, the data were downloaded into Excel files and imported into SPSS.

Creation of master SPSS databases
For the longitudinal assessment which compared incoming and graduating student data and for which regression analyses were performed, the individual class SPSS databases were combined into a master database. Master databases were created for each of the following: all years of UIC alumni data; UIC and SIU incoming student data for UIC classes of 2013–2016 and SIU classes of 2013–2017; UIC and SIU graduating student data for UIC classes 2011–2013 and alumni 2014 and SIU classes of 2012–2015. A master database was also created for UIC and SIU incoming and graduating student data for common variables so that a longitudinal analysis could be conducted on these data.

QUALITATIVE DATA

As specified above, most interviews and focus groups were recorded and transcribed. However, the UIC admissions committee focus groups and the extramural phone interviews at both schools relied on field notes which were taken during the sessions. These notes were reviewed and expanded upon immediately after the sessions. Field notes were also taken at observation sessions and were also expanded upon after the session. In some cases, two Loyola research staff members took field notes and the notes of both individuals were integrated into one document.

Data reporting
The data for each school was analyzed separately for each data type, i.e., incoming student surveys, faculty surveys, extramural rotation focus groups, etc. Data were analyzed after each year of data collection and reports were submitted to ILCHF semi-annually. For data that was collected over a period of more than one year, such as student survey data, the data were analyzed after every year of collection.

Limitations of the analysis

Overall, the data collection process proceeded smoothly after collaborative relationships between CURL and the dental schools had been established and after the data collection process was routinized. Nonetheless, there were challenges with implementing many of the study components that had implications for data collection. Some of the challenges encountered were due to lean administrative staffing, changes in leadership and leadership support for the study, administrative miscommunications, competing organizational demands and personnel challenges.

Students

GRADUATING STUDENTS

SIU exit survey, classes of 2009–2011
The SIU exit surveys for the classes of 2009–2011 were given to Loyola in aggregate form only as SIU had reservations showing individual level data and assigning study ID numbers. This was resolved through discussion between SIU, ILCHF and Loyola in 2011, and case level data was available for the class of 2012. This did not affect the longitudinal study, as case level incoming data was first needed for the class of 2013.

SIU exit survey, class of 2013
There was an administrative snafu at SIU with the implementation of the class of 2013 exit survey. The survey was not implemented according to protocol and the initial data was unusable. The surveys that had been completed were disassembled and the pages were mixed up so that specific responses could not be linked to a specific study ID number. After many communications between SIU and Loyola about this issue, the survey was repeated in 2014 with the class of 2014 alumni, however this resulted in a low response rate of 33%. Loyola and SIU agreed to compensate for this problem by adding another year of data collection for the class of 2015.

UIC class of 2014 exit survey data
Due to a communication error, an exit survey for the class of 2014 was not completed, leaving only one year of longitudinal data. To compensate, a selection of questions found on the exit survey were included in the 2014 alumni survey. By comparing previous exit and alumni surveys, it was determined that responses were similar for new graduates and alumni; therefore, the data was included in the logistic regression model as a proxy for the 2014 exit survey. Because this survey was distributed with the alumni survey, the response rate was greatly reduced, resulting in the relatively small sample size.

ALUMNI

UIC class of 2010 alumni survey data
Members of the class of 2010 were scheduled to complete an alumni survey for which responses were to be matched by study ID number. Due to an administrative error at UIC, the master list linking study ID numbers to students in the class of 2010 was lost. This meant that the data could be analyzed in aggregate form but not longitudinally. To compensate for this, one additional class was asked to participate in the alumni survey, i.e., the class of 2014.

UIC alumni survey classes of 2011–2014

Beginning with the class of 2011, UIC was not able to obtain contact information for all members of the class. UIC was only able to locate that information for approximately 50 members of each graduating class. UIC did not have a mechanism to have contact information for all graduates. Nonetheless, the alumni survey response rates for the classes of 2011 and 2012 were 41% and 46% respectively which is similar to the response rates for the classes of 2009 (51%) and 2010 (44%). However, the response rates from the classes of 2013 and 2014 declined dramatically for an unknown reason. The survey response rates for the classes of 2013 and 2014 were 19% and 21% respectively. This had broad effects on the types and validity of analysis that could be done. It limited the student longitudinal outcome study to two time points, instead of three (see below), and also effected the degree to which the sample represents the class as a whole. It should therefore be noted that the conclusions drawn from the descriptive statistics only pertain to the students who completed an alumni survey and should not be extrapolated to the rest of the class.

SIU alumni survey

We were not able to conduct alumni surveys at SIU. One had been agreed to as part of the initial study design at SIU and an instrument was created and tentatively agreed to with program faculty. Due to delays in receiving approval for the instrument and timing issues, an implementation could not be accomplished.

LONGITUDINAL DATA

The initial research design planned for the construction of a longitudinal database at three points in time, at matriculation, at graduation and approximately two years after graduation as alumni to measure career preferences and plans. For UIC, this would have applied to the class of 2013, while for SIU, it would have applied to the classes of 2013 and 2014. Due to the collection problems outlined above, a three-time point analysis was not possible. However, this was not as limiting as anticipated. Comparisons between the UIC alumni and graduation data suggested that responses were similar. Thus, there was not a significant loss of information from removing alumni data from the student longitudinal study.

RESEARCH DESIGN AND STUDY TIMEFRAME

The complexity of the timeframe for the full implementation of the curricular changes at both schools and the planned conclusion of data collection resulted in a short timeframe for the assessment of impact on career choices. This limited our ability to assess the broad impact of the curricular initiatives. The initial plan was to collect exit survey data for UIC from the classes of 2009–2013 and at SIU from 2009–2014. This difference in timeframe was due to UIC beginning their implementation of expanded extramural rotations earlier than SIU. This research design was also based on an assumption that there was a clear demarcation between the old curricular approach at each school and the new curricular approach. In practice, both schools phased in their curricular changes over time. At both schools, the extramural education curriculum had changed with the class of 2013 which was the full treatment group. However, most of the curricular changes had occurred with the class of 2012, especially at UIC where many students had participated in expanded extramural rotations. In addition, there were challenges in analyzing

the UIC data because students did not have uniform educational experiences. Some students had short rotations of 20-25 days, others had rotations of approximately 50 days, while others had rotations of 100 days.

CEILING EFFECTS

CURL researchers analyzed the data on an ongoing basis. Midway through the data collection and analysis process, there were indicators that there were ceiling effects among students in relation to attitudes towards providing care to the underserved. This raised the issue of whether it would be difficult to demonstrate an impact from the ILCHF-funded curricular initiatives given the initial research design. Leaders at both schools believed that the major impacts of the curricular changes on workforce development were unlikely to show up in the short time frame after graduation that corresponded with the timeframe for this study. Consequently, all parties agreed to modifications in the research design to better assess programmatic successes. Additional study components were added which included student focus groups and debriefing interviews with key faculty and leaders at both schools.

FACULTY

SIU and UIC faculty surveys

The response rates for the faculty at both schools was much lower than expected. The leadership at both schools were reticent to implement the faculty surveys. There were very long delays with creating a survey instrument that was mutually agreeable to all parties and subsequently to implementing the surveys. There also seemed to be little interest in promoting faculty completion of the surveys. Despite the low response rates, the surveys still provided useful information about sources of faculty information and faculty views about extramural education.