



# Managing Caries in Virtual Dental Homes Using Interim Therapeutic Restorations

PAUL GLASSMAN, DDS, MA, MBA; PAUL SUBAR, DDS, EDD; AND  
ALAN W. BUDENZ, MS, DDS, MBA

**ABSTRACT** The Pacific Center for Special Care at the University of the Pacific, Arthur A. Dugoni School of Dentistry has developed the virtual dental home (VDH) system, which uses allied dental professionals trained to place interim therapeutic restorations (ITR) under the general supervision of dentists. This paper reviews the scientific basis for the ITR, as used in the VDH system, in managing caries lesions and delivering oral health care to underserved and vulnerable populations.

## AUTHORS

**Paul Glassman, DDS, MA, MBA**, is professor of Dental Practice and director of Community Oral Health at the University of the Pacific, Arthur A. Dugoni School of Dentistry in San Francisco. He is also the director of the Pacific Center for Special Care.  
*Conflict of Interest Disclosure: None reported.*

**Paul Subar, DDS, EdD**, is assistant professor and director of the Special Care Clinic/Hospital Dentistry Program at the University of the Pacific, Arthur A. Dugoni School of Dentistry in San Francisco.  
*Conflict of Interest Disclosure: None reported.*

**Alan W. Budenz, MS, DDS, MBA**, is a professor in the Department of Biomedical Sciences and Department of Dental Practice and the vice chair of Diagnostic Sciences and Services at the University of the Pacific, Arthur A. Dugoni School of Dentistry in San Francisco.  
*Conflict of Interest Disclosure: None reported.*

The purpose of this paper is to review the scientific basis for the role of interim therapeutic restorations (ITR), as used in the virtual dental home system (VDH), in managing caries lesions and delivering oral health care to underserved and vulnerable populations. Earlier papers described the structure of the VDH system and community-based prevention and early intervention strategies described some of the scientific literature in these areas.<sup>1,2</sup> This paper focuses on the ITR and incorporates additional and newer evidence.

### The Virtual Dental Home

The VDH is a system for delivering oral health services to underserved and vulnerable populations using geographically distributed, telehealth-

enabled teams working in community locations outside of the traditional dental care delivery system.<sup>1</sup> Developed by the Pacific Center for Special Care at the University of the Pacific, Arthur A. Dugoni School of Dentistry (Pacific), this system is being demonstrated in communities across California. The VDH system was designed to address the significant access challenges and health disparities faced by large and increasing segments of the population. These disparities were described in the 2000 report of the U.S. Surgeon General and affirmed by the 2011 reports of the Institute of Medicine and the National Research Council of the National Academies of Science, *Advancing Oral Health in America and Improving Access to Oral Health Care for Vulnerable and Underserved Populations*.<sup>3,4,5</sup>

By creating a VDH in sites throughout California, Pacific is delivering oral health services in locations where traditionally underserved people live, work, play, go to school and receive social services. This system promotes collaboration between dentists in dental offices and clinics and community-based allied dental professionals. This system redefines the use of the term “dental home” to include the entire geographically distributed, collaborative, telehealth-facilitated system of care. The VDH provides all the ingredients of the health home, including health education and promotion activities, tracking of patient needs and experiences, help with navigation of the health system, referral for advanced work when needed and integration of oral health issues into the educational, social and general health environment where it is being used. The system also puts dentists at the head of the distributed team, and most importantly, it brings much-needed services to individuals who might otherwise receive no care. Equipped with portable imaging equipment and an Internet-based dental record system, the allied dental professionals working in the VDH system collect electronic dental records including radiographs, photographs, charts of dental findings and dental and medical histories, and upload the information to a secure website where the records are reviewed by a collaborating dentist. The dentist reviews the patient’s information and creates a dental treatment plan.

### ITRs in the VDH System

In addition to collecting diagnostic information, delivering health promotion and prevention education, performing preventive procedures and providing case management services, allied professionals

in the VDH system are trained to place ITRs. It should be noted that “interim therapeutic restoration” as used in the VDH system is the term developed by the American Academy of Pediatric Dentistry (AAPD) in its *Policy on Interim Therapeutic Restorations (ITR)*.<sup>6</sup> As described in that document, and discussed later in this paper, this term is used to describe the technique referred to more broadly in the literature as atraumatic restorative treatment (ART). The new term, ITR, is used by the AAPD to emphasize the

## THIS SYSTEM PROMOTES collaboration between dentists in dental offices and clinics and community-based allied dental professionals.

provisional nature of the restoration. Allied dental professionals in the VDH demonstration project are placing ITRs under general supervision of dentists in the Health Workforce Pilot Project (HWPP) authorized by the California Office of Statewide Health Planning and Development (OSHPD).<sup>7,8</sup>

The VDH system has trained allied dental professionals to place ITRs under the general supervision of dentists. In this system, the dentist determines that a particular tooth should have a specific ITR (i.e., which tooth and surfaces are to be treated) and provides instructions to the allied dental professional to place the restoration. The allied dental professional then places the interim restoration without the dentist being present in the treatment location. These steps conform

to the definition of general supervision in California law where general supervision means supervision of dental procedures based on instructions given by a licensed dentist but not requiring the physical presence of the supervising dentist during the performance of those procedures.<sup>9,10</sup>

In the VDH system, dentists use a specific set of criteria to determine which teeth should have an ITR placed. The criteria are based on both patient factors and tooth factors as listed below.

### Patient Factors

- The patient’s American Society of Anesthesiologists Physical Status Classification (ASA status) is Class III or less.
- The patient is cooperative enough to have the restoration placed without the need for special protocols (i.e., sedation or physical support).
- The patient or responsible party has provided consent for the procedure.
- The patient reports that the tooth is asymptomatic, or if there is mild sensitivity to sweet, hot or cold, that the sensation stops within seconds of the stimulus being removed.

### Tooth Factors

- The cavity must be accessible without the need for creating access using a dental handpiece.
- The margins of the cavity must be accessible so that clean noncarious margins can be obtained around the entire periphery of the cavity with the use of hand instruments.
- The depth of the lesion must be more than 2 mm from the pulp on radiographic examination or must be judged by the dentist to be a shallow lesion.
- The tooth must be restorable and not have other significant pathology.

Once a dentist determines the need and instructs the allied dental professional to place an ITR in a specific tooth, an appointment is scheduled for that procedure to be completed. The specific technique being used in the VDH system involves removing soft material from the cavity with hand instruments only while avoiding removal of any material from the pulpal floor in all but superficial lesions. Care is taken to obtain clean, noncarious margins. The tooth is then cleaned, conditioned and a high-viscosity, glass-ionomer restorative material is placed in the cavity.

### Diffusion of Innovation

While there is extensive literature on the history and effectiveness of the ART and ITR techniques, many dentists are not aware of this literature and were trained at a time when principles of caries disease management differed from the current scientific understanding. It is well known that “diffusion of innovation” takes a long time and practice patterns are not easily changed, even in the face of knowledge about new scientific understanding.<sup>11,12</sup> In fact, a recent publication about dentists’ use of evidence-based guidelines concluded that “ingrained practice behavior based on personal clinical experience that differed substantially from evidence-based recommendations resulted in a rejection of these recommendations.”<sup>13</sup> However, the legal environment for defining standards of care is changing and it is becoming increasingly important for oral health professionals to understand and practice according to the current scientific basis for the procedures they perform.<sup>14,15</sup>

Equally important to the diffusion of innovation is the adoption of new scientific findings and recommendations into dental education. Much of dental

education is still based on the one-directional flow of information from the faculty to the students, versus a problem-based learning system. Professionals educated in the one-directional flow manner have greater difficulty in accepting and adopting new techniques and recommendations. However, the knowledge and acceptance of the ART and ITR techniques by dental school faculty, with subsequent incorporation into the dental student curriculum, has fortunately been slowly growing. In a

**EQUALLY IMPORTANT TO  
the diffusion of innovation  
is the adoption of new  
scientific findings and  
recommendations into  
dental education.**

survey of U.S. general dental practitioners conducted in 2003, 55 percent reported having received some form of dental school education in the ART technique in lectures, laboratory exercises and/or hands-on clinical experiences.<sup>16</sup> Additionally, 67 percent of the survey respondents reported performing ART procedures at least sometimes (44 percent often to very often) and 40 percent desired further training on ART techniques. In a similar survey conducted in the United Kingdom in 2005, 42 percent of respondents reported awareness of ART techniques and most used true or modified ART techniques in their practices.<sup>17</sup> The greatest adoption of ART and ITR techniques has been in Latin American countries. In 2009, more than 95 percent of Brazilian dental schools

reported teaching the ART technique and it is widely and routinely used throughout most Central and South American countries, from Mexico to Chile.<sup>18,19</sup> Currently, the vast majority of dental schools in the U.S. are participating in CAMBRA coalitions, which are expanding education in risk assessment, medical management and minimally invasive dentistry and where teaching students about the principles described in this paper is included.

### History of ART, ITR and Sealing Cavities

The ART technique for treatment of carious lesions has been used in many countries around the world since its introduction in Tanzania in the mid-1980s. Similar techniques are referred to as ITRs and as “sealing cavities.” The world literature on ART has been extensively reviewed.<sup>20</sup> In fact, the World Health Organization has produced a training manual for public health workers titled *How to Carry Out Atraumatic Restorative Treatment (ART) on Decayed Teeth*.<sup>21</sup> The WHO manual describes a simple technique that “can be implemented by properly trained personnel with even nondental backgrounds,” even “under field conditions where there is a lack of electricity and modern dental facilities.” The technique described involves the use of “hand instruments only (no electric drills used) for widening cavity openings and for excavating soft, decayed tissue from within the cavity, followed by the application of an adhesive dental material, usually a high-viscosity glass ionomer filling material, into the cavity and over the adjacent pits and fissures.”

The AAPD has adopted the term interim therapeutic restoration. As described in the AAPD *Policy on Interim Therapeutic Restorations*, ITR techniques are almost identical to ART techniques,

CONTINUES ON 750

CONTINUED FROM 747

but the stated purpose of the new name is to emphasize the provisional nature of the restoration.<sup>6</sup> The primary technique difference in the AAPD ITR description is the “removal of caries using hand or *slow-speed rotary instruments*.”

Because the ART technique has been widely used in third-world countries, usually in less than optimal conditions, it has been considered by some to be inferior to conventional dental restorative techniques. However, there is substantial and ever-increasing evidence that in certain situations, the techniques used in ART or ITR produce equal, or in some cases superior, outcomes compared to those produced by conventional restorative techniques. The remainder of this paper will describe this evidence and the scientific basis for concluding that these techniques should have an important role in management of dental caries disease.

Traditional approaches to the restoration of caries lesions in teeth require that clearly defined preparations be created within a tooth, as well as the complete removal of decay. These techniques often sacrifice healthy tooth structure in an effort to provide adequate retention when using nonadhesive materials such as amalgam. As material science has developed, the use of bonded composite and glass ionomer restorative materials have given dentistry new and improved ways to restore teeth with greater conservation of healthy structure.<sup>22</sup>

As our understanding of the pathogenesis of caries disease has increased, the methods in which dentistry treats caries lesions has also shifted. It has become clear that the caries disease process is caused by an ecological shift in the oral biofilm from beneficial to acidogenic bacterial

species. The resultant demineralization of enamel and dentin results in active decay. By reversing, or limiting the extent of salivary pH changes, teeth can be stabilized, and even remineralized.<sup>23</sup> Through use of conservative techniques and contemporary materials such as glass ionomers, it is possible to maintain healthy tooth structure, limit the risk of pulpal exposure and seal the cavity from the nutrient supplies needed by the acidogenic bacteria as part of an overall caries risk reduction strategy.

**BY REVERSING,  
or limiting the extent of  
salivary pH changes, teeth  
can be stabilized, and even  
remineralized.**

Glass ionomer restorations, introduced roughly 40 years ago, adhere to enamel and dentin primarily via calcium bonds to the mineral content of tooth structure. This provides an adaptive seal closely matched to a tooth's coefficient of expansion and contraction. Because of its unique chemistry, glass ionomer materials are most effective when placed in a wet environment, which promotes a strong chemical bond to both enamel and dentin. In addition, glass ionomer materials release fluoride into the surrounding tooth structure as a rechargeable fluoride reservoir.<sup>24,25</sup> Because of the strong chemical bond of glass ionomer materials to both enamel and dentin, and because of the fluoride release, glass ionomer materials can

stop, or at least limit, the activity of caries-causing acidogenic bacteria by depriving the bacteria of their nutrient supply and by the antimicrobial effect of fluoride.<sup>26</sup> The fluoride release also remineralizes and strengthens the surrounding tooth structure and helps to prevent recurrent decay.

Numerous studies and systematic reviews have been carried out to evaluate the ability of glass ionomer restorations to stabilize caries lesion activity, how they affect pulpal and periapical tissues, and what this may mean to a patient's experience in receiving interim care. The clinical research demonstrates favorable safety and effectiveness when conservative, partial caries removal is used versus complete caries removal as advocated by traditional restorative techniques. Additionally, conservative approaches followed by bondable restorations show diminished bacterial loads and evidence that partially excavated teeth do not have higher restoration failure rates.<sup>27,28,29,30</sup> In a 2013 study by Schwendicke et al., a systematic review of 1,257 patients and 1,628 teeth examined the effects of complete versus incomplete decay removal before restoration placement.<sup>31</sup> The authors evaluated the risk of pulpal exposure, post operative pulpal symptoms, restoration failure and caries progression. Although the risk of restoration failure appeared similar for complete versus incomplete decay removal, there were significant risk reductions for pulpal exposure and pulpal symptoms in the incomplete decay removal group. There was also not enough evidence to conclude that one technique was superior to the other in reducing caries progression. In a systematic review by Ricketts et al., 934 patients and 1,375 teeth were included in the study.<sup>32</sup> A comparison of complete

caries excavation versus partial caries excavation was completed using a variety of bonded and conventional restorations. Pulpal exposure occurred in 22 percent of the teeth treated with complete caries excavation versus only 5 percent in teeth treated with partial caries excavation. Positive postoperative signs and symptoms at one-year follow-up occurred in 5 percent of teeth that had complete caries removal versus only 1.3 percent for partially excavated teeth. Failure of the restoration occurred in 6 percent of completely excavated teeth versus 2 percent for the partially excavated teeth.

Although the conservative approach of the ART, and ITR, technique was developed for patients experiencing barriers in accessing basic oral health care, other beneficial effects have been reported. Studies show that dental fear and anxiety affect roughly 10 percent to 20 percent of the U.S. population, resulting in disease progression, lost work and school hours and diminished quality of life.<sup>33,34</sup> Of all of the procedures in dentistry, fear of the sight and feel of a needle produces the most fear.<sup>35</sup> Because ART procedures, and ITR in the VDH, are done without the use of a drill or anesthetic, these procedures produce less pain and anxiety than conventional restorations. This has been verified in a systematic review by Carvalho that concluded that ART promotes less pain and discomfort for patients, even though the procedure is performed with no anesthesia, contributing to a reduction of anxiety and fear during the dental treatment.<sup>36</sup> This data leads to the conclusion that it is advantageous to provide these procedures to young children and those with dental fear as well as other patients in an effort to desensitize them to the dental experience.

## Conclusions

Pacific has developed and is demonstrating the VDH system. The VDH uses dentists working with allied dental professionals in geographically distributed, telehealth connected teams to bring oral health to traditionally underserved people across California. In addition to collecting diagnostic information, delivering health promotion and prevention education, performing preventive procedures and providing case management services, allied professionals in the VDH system are trained to place ITRs under the general supervision of dentists.

The technique used to place ITRs in the VDH system is similar to what has been described in the extensive literature on ART. Although first described as a technique suited for countries where dental care is delivered in less than optimal conditions, there is substantial, increasing evidence that in certain situations the techniques used in ART or ITR produce equal, or in some cases superior, outcomes compared to the outcomes produced by conventional restorative techniques. The ITR technique does not require the removal of all caries infected tooth structure, can stop the progress of decay and can restore function and esthetics while producing fewer pulpal symptoms, less pain and less anxiety than conventional restorative techniques. When used with children and adults who do not access the traditional dental care system in the VDH system, this technique can keep caries from progressing while allowing dentists to monitor the tooth and make further treatment decisions. It is a valuable adjunct to the VDH system and a technique with increasing utility in traditional dental settings. ■■■■

## REFERENCES

1. Glassman P, Harrington M, Namakian M, Subar P. The Virtual Dental Home: Bringing Oral Health to Vulnerable and Underserved Populations. *J Calif Dent Assoc* 2012; 40(7):569-577.
2. Budenz A, Subar P. Community-based Prevention and Early Intervention Strategies. *J Calif Dent Assoc* 2012;40(7):597-603.
3. U.S. Department of Health and Human Services. *Oral Health in America: A Report of the Surgeon General*. Rockville, MD: U.S. Department of Health and Human Services, National Institute of Dental and Craniofacial Research, National Institutes of Health, 2000.
4. The Institute of Medicine. *Advancing Oral Health in America*. 2011. The National Academies Press. Washington D.C.
5. The Institute of Medicine and the National Research Council. *Improving access to oral health care for vulnerable and underserved populations*. 2011. The National Academies Press. Washington D.C.
6. American Academy of Pediatric Dentistry. Policy on Interim Therapeutic Restorations (ITR). Adopted 2001. Revised 2004, 2008. [www.aapd.org/media/Policies\\_Guidelines/P\\_ITR.pdf](http://www.aapd.org/media/Policies_Guidelines/P_ITR.pdf). Accessed Jan. 15, 2012.
7. California Office of Statewide Planning and Development. Health Workforce Pilot Project Program. [www.oshpd.ca.gov/hwdd/HWPP.html](http://www.oshpd.ca.gov/hwdd/HWPP.html). Accessed Jan. 15, 2012.
8. California Office of Statewide Planning and Development. Health Workforce Pilot Project Application #172. [www.oshpd.ca.gov/hwdd/pdfs/HWPP/Abstract\\_HMPP172.pdf](http://www.oshpd.ca.gov/hwdd/pdfs/HWPP/Abstract_HMPP172.pdf). Accessed Jan. 15, 2012.
9. California Business and Professions Code Section 1741(c).
10. California Business and Professions Code Section 1902(d).
11. Berwick DM. Disseminating Innovations in Health Care. *J Am Dent Assoc* 2003;289(15):1969-1975.
12. Cain M, Mittman R. Diffusion of Innovation in Health Care. California Health Care Foundation. 2002.
13. O'Donnell JA, Modesto A, Oakley M, et al. Sealants and dental caries insight into dentists' behaviors regarding implementation of clinical practice recommendations. *J Am Dent Assoc* 2013;144(4):e24-e30.
14. Niederman R, Richards D, Brands W. The changing standard of care. *J Am Dent Assoc* 2012;143(5):434-437.
15. Ambrogio R. California Takes a Giant Step Towards Daubert. *BullsEye Blog*, Dec. 18, 2012. [www.ims-expertservices.com/blog/2012/california-takes-step-towards-daubert](http://www.ims-expertservices.com/blog/2012/california-takes-step-towards-daubert). Accessed May 27, 2013.
16. Seale NS, Casamassimo PS. Access to dental care for children in the United States: A survey of general practitioners. *J Am Dent Assoc* 2003;134(12):1630-1640.
17. Burke FJT, McHugh S, Shaw L, et al. U.K. dentists' attitudes and behavior toward atraumatic restorative treatment for primary teeth. *Br Dent J* 2005;199(6):365-369.
18. Navarro MF, Modena KC, Freitas MCC, Fagundes TC. Transferring ART research into education in Brazil. *J Appl Oral Sci* 2009;17(sp. issue):99-105.
19. Ruiz O, Frencken JE. ART integration in oral health care systems in Latin American countries as perceived by directors of oral health. *J Appl Oral Sci* 2009;17(sp. issue):106-113.
20. Frencken JE, Leal SC, Navarro MF. Twenty-five-year atraumatic restorative treatment (ART) approach: a comprehensive overview. *Clin Oral Invest* 2012;16(5):1337-46.
21. Momand P, Stjernswärd J. *How to carry out atraumatic*



### Fellowship in Geriatric Dentistry

The UCSF Multidisciplinary Geriatric Fellowship in Dentistry, Medicine and Mental/Behavioral Health seeks qualified dental applicants who are interested in:

1. Enhancing their ability to provide quality care to older adults;
2. Advanced training for a career in hospital dentistry, public health, teaching and research, or practice specializing in the treatment of older adults;
3. Interdisciplinary, team-based clinical experiences.

#### Program Overview

This one or two year fellowship offers interdisciplinary, team-based clinical, education, leadership and research training in the care of older adults, with a focus on underserved populations. The program includes a core didactic curriculum combined with clinical training and the opportunity to conduct research. Education and clinical activities are uniquely adapted to prior experience and interests of each fellow.

#### Eligibility and Application Information

- Licensed or eligible to pursue licensure to practice dentistry in California
- U.S. citizen or permanent resident status
- Previous post-doctoral training or clinical practice experience
- Education stipend provided; may be eligible for education loan deferment
- Applications are now being accepted for 2014-2015. Please submit a CV, Personal Statement and 3 Letters of Recommendation to Elaine Chow, email address below.
- For more program information please visit the following website: <http://dentistry.ucsf.edu/admissions/postgraduate-programs/fellowship-in-geriatric-dentistry>

A rolling admissions process will be used. We will review applications beginning in September with interviews starting as early as October. Applicants are encouraged to apply as early as possible.

#### For further information please contact:

Elaine Chow  
Geriatrics Education Coordinator  
Department of Medicine  
University of California, San Francisco  
4150 Clement St. VA181G  
San Francisco, CA 94121  
Phone: 415-221-4810 x 4453  
Fax: 415-750-6641  
Email: [echow@medicine.ucsf.edu](mailto:echow@medicine.ucsf.edu)

*restorative treatment (ART) on decayed teeth: A training manual for public health workers.* World Health Organization. 2008.

22. Mertz-Fairhurst EJ, Curtis JW, Ertle JW, et al. Ultraconservative and cariostatic sealed restorations: Results at year 10. *J Am Dent Assoc* 1998;129:55-65.
23. Jensen L, Budenz AW, Featherstone JD, et al. Clinical protocols for caries management by risk assessment. *J Calif Dental Assoc* 2007;35(10):714-723.
24. Rekha CV, Varma B. Comparative evaluation of tensile bond strength and microleakage of conventional glass ionomer cement, resin modified glass ionomer cement and compomer: An in vivo study. *Contemp Clin Dent* 2012 Jul-Sep;3(3):282-287.
25. Basso GR, Della Bona A, Gbbi DL, Cecchetti D. Fluoride release from restorative materials. *Braz Dent J* 2011; 22(5):35-8.
26. Oong EM, Griffin SO, Kohn WG, Gooch BF, Caulfield PW. The effect of dental sealants on bacterial levels in caries lesions: a review of the literature. *J Am Dent Assoc* 2008;139(3):271-8.
27. Foley J, Evans D, Blackwell A. Partial caries removal and cariostatic materials in carious primary molar teeth: A randomized controlled clinical trial. *Br Dent J* 2004;197(11):697-701.
28. Maltz M, Henz SL, de Oliveira EF, et al. Conventional caries removal and sealed caries in permanent teeth: a microbiological evaluation. *J Dent* 2012;40:776-782.
29. Thompson V, Craig RG, Curro FA, et al. Treatment of deep carious lesions by complete excavation or partial removal: A critical review. *J Am Dent Assoc* 2008;139:705-712.
30. Innes NPT, Evans DJP, Stirrups DR. Sealing caries in primary molars: Randomized control trial, 5 year results. *J Dent Res* 2011;90(12):1405-1410.
31. Schwendicke F, Dorfer CE, Paris S. Incomplete caries removal: A systematic review and meta-analysis. *J Dent Res* 2013;92(4):306-314.
32. Ricketts D, Lamont T, Innes NPT, Kidd E, et al. Operative caries management in adults and children. *The Cochrane Collaboration* 2013;3:1-51.
33. Tickle M, Milsom K, Crawford FI, et al. Dental anxiety is considerably associated with pain experience during dental procedures. *Community Dent Oral Epidemiol* 2012 Aug;40(4):343-350.
34. Gordon D, Heimberg RG, Tellez M, et al. A critical review of approaches to the treatment of dental anxiety in adults. *J Anxiety Disord* 2013;Apr:1-14.
35. Erten H, Akarslan ZZ, Bodrumlu E. Dental fear and anxiety levels of patients attending a dental clinic. *Quintessence Int* 2006 Apr;37(4):304-310.
36. Carvalho TS, Ribeiro TR, Bonecker M, et al. The atraumatic restorative treatment approach: An "atraumatic" alternative. *Med Oral Pathol Oral Cir Bucal* 2009 Dec;14(12):668-673.

**THE CORRESPONDING AUTHOR**, Paul Glassman, DDS, MA, MBA, can be reached at [pglassman@pacific.edu](mailto:pglassman@pacific.edu).