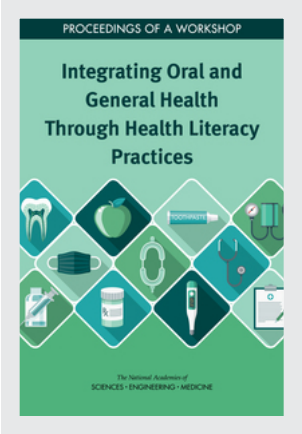

Integrating Oral and General Health Through Health Literacy Practices: Proceedings of a Workshop (2019)

DETAILS

122 pages | 6 x 9 | PAPERBACK
ISBN 978-0-309-49348-2 | DOI 10.17226/25468

CONTRIBUTORS

Steve Olson and Alexis Wojtowicz, Rapporteurs; Roundtable on Health Literacy; Board on Population Health and Public Health Practice; Health and Medicine Division; National Academies of Sciences, Engineering, and Medicine

SUGGESTED CITATION

National Academies of Sciences, Engineering, and Medicine 2019. *Integrating Oral and General Health Through Health Literacy Practices: Proceedings of a Workshop*. Washington, DC: The National Academies Press. https://doi.org/10.17226/25468.

Integrating Oral and General Health Through Health Literacy Practices

PROCEEDINGS OF A WORKSHOP

Steve Olson and Alexis Wojtowicz, *Rapporteurs*

Roundtable on Health Literacy

Board on Population Health and Public Health Practice

Health and Medicine Division

The National Academies of
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THE NATIONAL ACADEMIES PRESS
Washington, DC
www.nap.edu

THE NATIONAL ACADEMIES PRESS 500 Fifth Street, NW Washington, DC 20001

This activity was supported by contracts between the National Academy of Sciences and AbbVie Inc.; American Association for Dental Research; American Dental Association; American Dental Education Association; Bristol-Myers Squibb; California Dental Association; East Bay Community Foundation (Kaiser Permanente); Eli Lilly and Company; Health Literacy Media; Health Literacy Partners; Health Resources and Services Administration (HHSH25034011T); Institute for Healthcare Advancement; Merck Sharp & Dohme Corp.; National Institute of Dental and Craniofacial Research; National Library of Medicine; Northwell Health; Office of Disease Prevention and Health Promotion (HHSP23337043); Pfizer Inc.; and UnitedHealth Group. Any opinions, findings, conclusions, or recommendations expressed in this publication do not necessarily reflect the views of any organization or agency that provided support for the project.

International Standard Book Number-13: 978-0-309-49348-2
International Standard Book Number-10: 0-309-49348-X
Digital Object Identifier: https://doi.org/10.17226/25468

Additional copies of this publication are available from the National Academies Press, 500 Fifth Street, NW, Keck 360, Washington, DC 20001; (800) 624-6242 or (202) 334-3313; http://www.nap.edu.

Printed in the United States of America

Suggested citation: National Academies of Sciences, Engineering, and Medicine. 2019. *Integrating oral and general health through health literacy practices: Proceedings of a workshop*. Washington, DC: The National Academies Press. doi: https://doi.org/10.17226/25468.

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PLANNING COMMITTEE ON INTEGRATING ORAL AND GENERAL HEALTH THROUGH HEALTH LITERACY PRACTICES[1]

KATHRYN ATCHISON, Professor, School of Dentistry and Fielding School of Public Health, University of California, Los Angeles
PHYLLIS BEEMSTERBOER, Professor of Dentistry and Medicine; Director, Program in Compassionate Communication; and Associate Director, Center for Ethics in Health Care, Oregon Health & Science University
SUSAN FISHER-OWENS, Clinical Professor of Pediatrics and Clinical Professor of Preventive and Restorative Dental Sciences, University of California, San Francisco
NICOLE HOLLAND, Assistant Professor and Director of Health Communication, Education, and Promotion, Tufts University School of Dental Medicine
ALICE HOROWITZ, Research Associate Professor, Horowitz Center for Health Literacy, University of Maryland, College Park, School of Public Health
DUSHANKA V. KLEINMAN, Professor, Department of Epidemiology and Biostatistics, and Associate Dean for Research, University of Maryland, College Park, School of Public Health
IRA B. LAMSTER, Clinical Professor, School of Dental Medicine, Stony Brook University
GAYLE MATHE, Director, Community Health Policy and Programs, California Dental Association

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ROUNDTABLE ON HEALTH LITERACY[1]

BERNARD M. ROSOF (*Chair*), Chief Executive Officer, Quality in Health Care Advisory Group, LLC, and Professor of Medicine, Donald and Barbara Zucker School of Medicine at Hofstra/Northwell
ANNLOUISE R. ASSAF, Senior Director, Global Medical Impact, Worldwide Medical and Safety, Pfizer Inc., and Adjunct Professor, Brown University School of Public Health
SUZANNE BAKKEN, Alumni Professor of Nursing and Professor of Biomedical Informatics, Columbia University
GEMIRALD DAUS, Public Health Analyst, Office of Health Equity, Health Resources and Services Administration
TERRY C. DAVIS, Professor of Medicine and Pediatrics, Louisiana State University Health Sciences Center
CHRISTOPHER DEZII, Director, Healthcare Quality and Performance Measures, Bristol-Myers Squibb
JENNIFER DILLAHA, Medical Director for Immunizations, and Medical Advisor, Health Literacy and Communication, Arkansas Department of Health
JAMES DUHIG, Head, Risk Communication and Behavioral Systems, Office of Patient Safety, AbbVie Inc.
ALICIA FERNÁNDEZ, Professor of Medicine, University of California, San Francisco (UCSF), Director, UCSF Latinx Center of Excellence, and General Internist, Zuckerberg San Francisco General Hospital and Trauma Center
LISA FITZPATRICK, Senior Medical Director, DC Department of Health Care Finance, and Professorial Lecturer, Milken Institute School of Public Health, The George Washington University
LORI K. HALL, Director of Health Literacy, Global Medical Strategy and Operations, Eli Lilly and Company
LINDA HARRIS, Director, Division of Health Communication and eHealth Team, Office of Disease Prevention and Health Promotion, U.S. Department of Health and Human Services
NICOLE HOLLAND, Assistant Professor and Director of Health Communication, Education, and Promotion, Tufts University School of Dental Medicine
ELLEN MARKMAN, Lewis M. Terman Professor of Psychology, Stanford University

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JOHANNA MARTINEZ, Graduate Medical Education Director of Diversity and Health Equity, Northwell Health
MICHAEL McKEE, Assistant Professor of Family Medicine, University of Michigan Medical School
LAURIE MYERS, Global Health Literacy Director, Merck Sharp & Dohme Corp.
CATINA O'LEARY, President and Chief Executive Officer, Health Literacy Media
MICHAEL PAASCHE-ORLOW, Professor of Medicine, Boston University School of Medicine
TERRI ANN PARNELL, Principal and Founder, Health Literacy Partners
LINDSEY A. ROBINSON, Diplomate, ABPD, California Dental Association
STEVEN RUSH, Director, Health Literacy Innovations, UnitedHealth Group
OLAYINKA SHIYANBOLA, Assistant Professor, Division of Social and Administrative Sciences, University of Wisconsin–Madison School of Pharmacy
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CHRISTOPHER TRUDEAU, Associate Professor of Medical Humanities, University of Arkansas for Medical Sciences, and Associate Professor of Law, William H. Bowen School of Law, University of Arkansas at Little Rock
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ANNA W. MARTIN, Administrative Assistant

Consultant

LAWRENCE SMITH, Dean, Donald and Barbara Zucker School of Medicine at Hofstra/Northwell, and Executive Vice President and Physician-in-Chief, Northwell Health

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This Proceedings of a Workshop was reviewed in draft form by individuals chosen for their diverse perspectives and technical expertise. The purpose of this independent review is to provide candid and critical comments that will assist the National Academies of Sciences, Engineering, and Medicine in making each published proceedings as sound as possible and to ensure that it meets the institutional standards for quality, objectivity, evidence, and responsiveness to the charge. The review comments and draft manuscript remain confidential to protect the integrity of the process.

We thank the following individuals for their review of this proceedings:

SHARON BARRETT, School of Community Health and Policy, Morgan State University
JENNIFER HOLTZMAN, Bureau of Health Workforce, Health Resources and Services Administration
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Although the reviewers listed above provided many constructive comments and suggestions, they were not asked to endorse the content of the proceedings nor did they see the final draft before its release. The review of this proceedings was overseen by **NANCY FUGATE WOODS,** School of Nursing, University of Washington. She was responsible for making certain that an independent examination of this proceedings was carried out in

accordance with standards of the National Academies and that all review comments were carefully considered. Responsibility for the final content rests entirely with the rapporteurs and the National Academies.

Acknowledgments

The sponsors of the Roundtable on Health Literacy made it possible to plan and conduct the workshop Integrating Oral and General Health Through Health Literacy Practices, which this Proceedings of a Workshop summarizes. Federal sponsors from the U.S. Department of Health and Human Services are the Health Resources and Services Administration, National Library of Medicine, and Office of Disease Prevention and Health Promotion. Nonfederal sponsorship was provided by AbbVie Inc.; Bristol-Myers Squibb; California Dental Association; East Bay Community Foundation (Kaiser Permanente); Eli Lilly and Company; Health Literacy Media; Health Literacy Partners; Institute for Healthcare Advancement; Merck Sharp & Dohme Corp.; Northwell Health; Pfizer Inc.; and UnitedHealth Group. Additional support for this workshop was provided by the American Association for Dental Research, American Dental Association, American Dental Education Association, and National Institute of Dental and Craniofacial Research.

The workshop presentations were interesting and stimulated much discussion, and the Roundtable on Health Literacy would like to thank each of the speakers and moderators for their time and effort. Speakers and moderators were Amit Acharya, Kathryn Atchison, Meg Booth, Kelly Close, Susan Fisher-Owens, Anita Glicken, Alice Horowitz, Ronald Inge, Renée Joskow, Dushanka Kleinman, Ira Lamster, Wendy Mouradian, Dean Schillinger, Hugh Silk, John Snyder, George Taylor, Jane Weintraub, and Cassandra Yarbrough. The roundtable would also like to thank Brian Hill, who was unable to attend the workshop, but generously offered his insight during its planning.

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BOXES

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Acronyms and Abbreviations

ADA	American Dental Association
CDT	Code on Dental Procedures and Nomenclature
CME	continuing medical education
FQHC	federally qualified health center
GDM	gestational diabetes mellitus
HHS	U.S. Department of Health and Human Services
HPV	human papillomavirus
HRSA	Health Resources and Services Administration
IMB	Into the Mouths of Babes
IOM	Institute of Medicine
MORE Care	Medical Oral Expanded Care
NIDCR	National Institute of Dental and Craniofacial Research
OHCC	Oral Health Coordinating Committee
PDA	Permanente Dental Associates

RIDE	Regional Initiatives in Dental Education
TMD	temporomandibular joint disorder
TMJ	temporomandibular joint
UCLA	University of California, Los Angeles
UCSF	University of California, San Francisco
WIC	Special Supplemental Nutrition Program for Women, Infants, and Children

1

Introduction and Overview[1]

Oral health care and medical health care both seek to maintain and enhance human health and well-being. Yet, dentistry and primary care in the United States are largely separated and isolated from each other. Each has its own siloed systems for education, service delivery, financing, and policy oversight. The result has been duplication of effort, a cultural gap between the two professions, and lost opportunities for productive collaboration and better health.

On December 6, 2018, in Washington, DC, the Roundtable on Health Literacy of the National Academies of Sciences, Engineering, and Medicine held a workshop titled Integrating Oral and General Health Through Health Literacy Practices. Health literacy can be a powerful force in both driving and motivating the integration of oral health care and general health care, explained the roundtable chair, Bernard Rosof, chief executive officer of the Quality in Health Care Advisory Group, and professor of medicine in the Donald and Barbara Zucker School of Medicine at Hofstra/Northwell. "Health literacy occurs where system demands and complexities are aligned with individual skills and abilities," said Rosof. The integration of oral and general health through health-literate practices highlights the importance of system design—or redesign, where appropriate, Rosof observed.

[1]This section is based on the presentation by Bernard Rosof, chief executive officer, Quality in Health Care Advisory Group, and professor of medicine, Donald and Barbara Zucker School of Medicine at Hofstra/Northwell. His statements are not endorsed or verified by the National Academies of Sciences, Engineering, and Medicine.

The Roundtable on Health Literacy, which works to advance the field of health literacy to improve the health and well-being of all people, includes members from the dental profession and has a long history of addressing oral health literacy. In 2013, the roundtable convened a workshop on oral health literacy that explored state and national activities, discussed opportunities to assess oral health literacy, and served as a call to action (IOM, 2013). In 2015, members of the roundtable, working with other stakeholders, established an action collaborative group to explore ways in which health literacy principles and practices can help promote effective integration of oral health and general health into an actionable primary care model. In 2017, the oral health collaborative commissioned an environmental scan on integration efforts. The resulting paper, "Integrating Oral Health, Primary Care, and Health Literacy: Considerations for Health Professional Practice, Education, and Policy," is a comprehensive look at efforts to integrate systems that operate in what the authors call parallel, if not separate, universes.[2]

The December 6, 2018, workshop provided an opportunity to build on the commissioned paper and on the roundtable's previous efforts related to oral health. In addition to the roundtable's usual sponsors (see p. xi), the event was sponsored by several organizations focused on the subject of the workshop: the American Association for Dental Research, the American Dental Association, the American Dental Education Association, the Health Resources and Services Administration, and the National Institute of Dental and Craniofacial Research. Box 1-1 contains the Statement of Task for the workshop. The workshop planning committee (see p. v) consisted of Kathryn Atchison, Phyllis Beemsterboer, Susan Fisher-Owens, Nicole Holland, Alice Horowitz, Dushanka Kleinman, Ira Lamster, and Gayle Mathe.[3]

A few days before the workshop, the U.S. Department of Health and Human Services released a proposed framework for its Healthy People 2030 initiative, which includes a vision, mission, foundational principles, plan of action, and overarching goals. The proposed framework includes a statement that "achieving health and well-being requires eliminating health disparities, achieving health equity, and attaining health literacy," Rosof noted. He observed that this statement connects literacy to the concept of

[2] The commissioned paper is available at the website for the workshop: www.nationalacademies.org/HealthLiteracyRT (accessed April 4, 2019).

[3] The planning committee's role was limited to planning the workshop, and the Proceedings of a Workshop was prepared by the workshop rapporteurs as a factual summary of what occurred at the workshop. Statements, recommendations, and opinions expressed are those of individual presenters and workshop participants, are not necessarily endorsed or verified by the National Academies of Sciences, Engineering, and Medicine, and should not be construed as reflecting any group consensus.

BOX 1-1
Statement of Task

An ad hoc committee will plan and conduct a 1-day public workshop that will feature invited presentations and discussion on the ways in which health literacy principles and practices can facilitate the integration of dental and general health. A commissioned paper will be presented during the workshop. The workshop may include presentations and discussion of issues related to the challenges/barriers of integration, models of integration, effective health literacy strategies for promoting integration, and other areas as appropriate. The committee will define the specific topics to be addressed, develop the agenda, select and invite speakers and other participants, and moderate the discussions. A designated rapporteur will produce a proceedings of a workshop in accordance with institutional guidelines.

value described by Michael Porter (2010, p. 2477) in the *New England Journal of Medicine*:

> Value—neither an abstract ideal nor a code word for cost reduction—should define the framework for performance improvement in health care…. Value should always be defined around the customer, and in a well-functioning health care system, the creation of value for patients should determine the rewards for all other actors in the system.

"As we continue to move to value-based payment," Rosof continued, "it is critical that we adopt a culture that recognizes that health literacy is key to delivering high-quality, person-centric care, health services, and programs."

STRUCTURE OF THE PROCEEDINGS

This summary of the workshop's presentations and discussions follows the structure of the workshop agenda (see Appendix A), though some of the observations made by participants at the workshop have been reorganized for greater continuity. (Appendix B contains biographies of the presenters.)

Chapter 2, which is based on the workshop's initial presentation, summarizes the major observations and conclusions of the commissioned paper and three of its recommendations related to health literacy.

Chapter 3, which summarizes the first panel discussion at the workshop, provides an overview of health literacy and systems thinking as a catalyst for the integration of oral health care and general health care.

Chapter 4, which is based on the workshop's second panel, looks in greater detail at how health literacy and care integration can improve health and well-being and lead to more patient-centered care.

Chapter 5, a summary of the third panel's deliberations, looks at various pathways to integration, including those made possible through a strong federal infrastructure, combined electronic health records, a vertically integrated health care system, and a specific intervention focused on children.

Chapter 6, which is based on the fourth and last panel discussion, examines the development of a research agenda and identifies touchpoints where health literacy can advance integration.

Chapter 7, which summarizes the final session of the workshop, provides reflections and insights offered by roundtable members on the day's presentations and discussions.

2

Integrating Oral Health, Primary Care, and Health Literacy[1]

To provide background for the discussions at the workshop, Kathryn Atchison, professor at the University of California, Los Angeles (UCLA), School of Dentistry, and in the UCLA Fielding School of Public Health, summarized the main conclusions of a paper commissioned by the roundtable, titled "Integrating Oral Health, Primary Care, and Health Literacy: Considerations for Health Professional Practice, Education, and Policy."[2] Atchison's co-authors on the paper were Gary Rozier and Jane Weintraub, both at the University of North Carolina at Chapel Hill.

IDENTIFYING RESOURCES FOR THE ENVIRONMENTAL SCAN

Using search criteria for U.S. articles published between 2000 and 2017, Atchison and her colleagues identified peer-reviewed articles and articles from the gray literature. They also identified and consulted with experts listed in conference programs, faculty members and administrators in dental and health professional schools with interprofessional educa-

[1] This chapter is based on a presentation by Kathryn Atchison, professor in the University of California, Los Angeles (UCLA), School of Dentistry, and in the UCLA Fielding School of Public Health, summarizing a paper commissioned by the Roundtable on Health Literacy, "Integrating Oral Health, Primary Care, and Health Literacy: Considerations for Health Professional Practice, Education, and Policy," by Kathryn Atchison, Gary Rozier, and Jane Weintraub. Her statements are not endorsed or verified by the National Academies of Sciences, Engineering, and Medicine.

[2] See www.nationalacademies.org/HealthLiteracyRT (accessed May 30, 2019) to download the complete paper.

tion programs, representatives of foundations that have funded integration programs, and government officials from the U.S. Department of Health and Human Services (HHS) and the National Institute of Dental and Craniofacial Research (NIDCR). They posted notices about the project on two listservs—a health literacy listserv and a dental public health listserv—and asked people doing studies that had not yet been published if they would share their results. They excluded intradisciplinary programs (such as adding mid-level providers to dental programs), stand-alone demonstration programs integrating primary care into dental practice, and stand-alone public health programs with no connection to primary care practice. "We conducted a unilateral, unidirectional review of oral health into primary care," said Atchison in her presentation at the workshop.

To identify the scope of practice for integration, they reviewed guidelines, consensus statements, and national surveys related to what dentists are doing in general health and what physicians are doing in dentistry. They also noted that the U.S. Preventive Services Task Force reviewed services related to integration three times, Atchison added. Only in the case of pediatric providers conducting preventive oral health services did the task force find enough evidence to make recommendations.[3] With both coronary heart disease and oral cancer, the task force found insufficient evidence to make recommendations.[4] As Atchison said, these results indicate a lack of current research on integration.

Atchison and her colleagues next sought an integrated care conceptual model that was broad enough to describe demonstrations of integration at multiple levels within an organization. The Rainbow Method of Integrated Care incorporates both functional integration and normative integration at four levels within an organization—the clinic, the professional, the organization, and the system. Atchison described how she and her colleagues modified this model to incorporate health literacy (see Figure 2-1). Reflecting features of this model, they then developed four categories of integration—three involving the integration of oral health into primary care and the fourth involving the accompanying integration of preventive health services provided by dental providers in dental settings:

[3] The recommendations and supporting documents are available at https://www.uspreventiveservicestaskforce.org/Page/Document/RecommendationStatementFinal/dental-caries-in-children-from-birth-through-age-5-years-screening (accessed April 4, 2019).

[4] The recommendations and supporting documents are available at https://www.uspreventiveservicestaskforce.org/Page/Document/RecommendationStatementFinal/coronary-heart-disease-screening-using-non-traditional-risk-factors (accessed April 4, 2019) and https://www.uspreventiveservicestaskforce.org/Page/Document/UpdateSummaryFinal/oral-cancer-screening1 (accessed April 4, 2019).

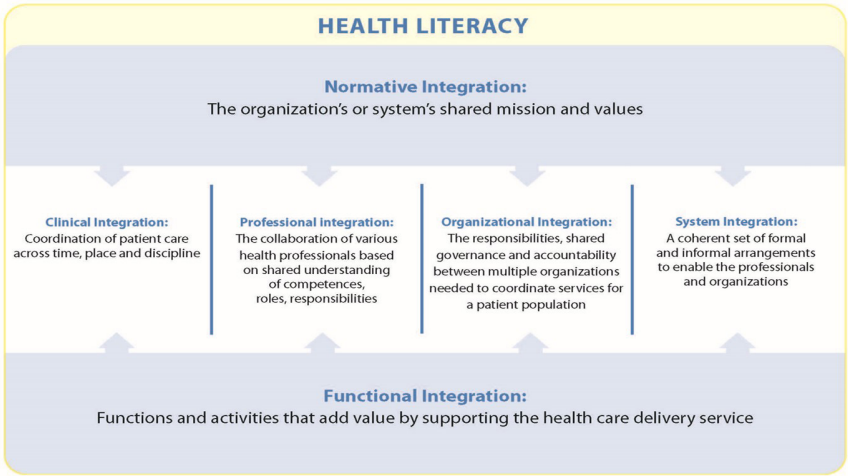

FIGURE 2-1 The twice-modified Rainbow Model of Integrated Care incorporating health literacy.
SOURCES: As presented by Kathryn Atchison at the workshop Integrating Oral and General Health Through Health Literacy Practices on December 6, 2018; adapted from Valentijn et al., 2013, by Atchison et al., 2018.

- Preventive oral health services provided by medical providers
- Preventive health services provided by dental providers in primary care clinics or nontraditional settings
- Case management, coordination, and referral
- Preventive health (nondental) services provided by dental providers in dental settings, but only if accompanied by one of the kinds of integration listed above

RESULTS OF THE ENVIRONMENTAL SCAN

Atchison informed the workshop that the resulting environmental scan found 32 publications, including 15 that were peer reviewed and 17 in the gray literature. The programs represented 28 states plus Washington, DC, and the National Head Start Association. They included statewide programs, countywide programs, and urban and rural programs focused on clinical and system-level quality improvement. Multisite programs were organized by age group, type of practice, setting, and other features. They identified the literature that was available as "robust," said Atchison, noting that it contains results on programs that have been tested in a variety of venues.

Of the 37 reports of preventive oral health services provided by medical providers (an article could have more than 1 report), 33 were on pediatric preventive oral health services, 10 were on medical providers who conducted oral health assessments for pregnant women and referred them to dentists, 5 involved patients who had chronic diseases (primarily diabetes), and 2 were not preventive but still involved integrating preventive oral health services into primary care (in Maine and New Mexico medical residents were trained to perform extractions because of a statewide paucity of dentists).

Atchison said that she and her colleagues found 16 examples of dental providers performing preventive and other oral health services in primary care clinics or nontraditional settings. These consisted mostly of dental services offered by hygienists to children in schools, services provided to pregnant women in primary care clinics, and services delivered in public health and community clinics. For example, in a rural area, a hygienist might work off site in a school or elsewhere with a physician rotating in once per month. Several publications referred to the introduction of dentists or dental residents into emergency departments to deal with emergencies and direct people to dental clinics.

Atchison added that they found 22 examples demonstrating integration of case management or coordination of care services. These related to increased access to dental services, community services, and social services, such as transportation, along with increased access to health education and prevention through navigation to dental clinics. "Different types of people, including social workers, community health workers, navigators, [and] nurses … were trying to assist patients to find appropriate primary care locations for their care," Atchison said. Electronic tools also helped with this navigation.

Finally, Atchison and colleagues found 16 examples of preventive medical services performed by dental providers. For example, dentists would screen and refer patients to a medical home for hypertension, HIV, or blood glucose evaluations. Or a dentist might review care plans to find gaps in preventive services, such as immunizations. Atchison and colleagues found that once an organization did one integration model and discovered that it worked, the organization was more likely to try another.

In general, interest in integration was evident, said Atchison, but the peer-reviewed literature was sparse. Few guidelines exist for establishing such programs, and most of the guidelines that do exist involve physicians doing preventive oral health services. Some pilot studies have been done on implementing integrative programs, but few studies discuss their effectiveness or outcomes in improving oral or general health. A wide variety of information is available about the programs, but the information has little consistency.

The purpose of the studies also varied, noted Atchison. Some focused on educating people about how to integrate services. Others sought to determine best practices for integrating oral health into managed care or accountable care organizations, which have seen some of the strongest work toward developing and understanding integration, according to Atchison. Guidelines for how to conduct and report on studies of integration would be helpful, she added.

INCLUDING HEALTH LITERACY IN INTEGRATION EFFORTS

Health literacy is a facilitator to integration, Atchison pointed out. She listed several applications of health literacy to integration at the clinical level:

- Develop educational materials in relevant languages.
- Use anticipatory guidance during oral health screening of chronic disease patients.
- Develop and use case management and patient navigation.
- Ask patients about dental symptoms (such as toothache, bleeding gums, loose teeth, trouble chewing).
- Ask patients about medical and dental homes and about last medical/dental visit.
- Develop and/or coordinate individualized multidisciplinary care plans.
- Interact in a culturally competent manner.
- Track and follow up on referrals.

At the professional level of integration, Atchison said that applications of health literacy include the following:

- Train the primary care team on how to conduct an oral assessment and caries risk assessment.
- Develop a shared and culturally appropriate vision for a department.
- Develop/foster interdisciplinary collaborations.
- Develop and follow clinical guidelines/protocols.
- Develop interprofessional governance for the collaboration.
- Create value for providers and patients of federally qualified health centers (FQHCs).

As an example, Atchison mentioned a case study of the Grace Health FQHC in Michigan (Atchison et al., 2018). A dental hygienist had been moved into the obstetrics/gynecology clinic but was not able to use the clinic's electronic health record to make follow-up appointments for patients.

In response, dentistry and the obstetrics/gynecology clinic worked together to open up the dental appointment system in the clinic's electronic health record to enhance integration.

Atchison noted that applications of health literacy at the organization level include the following:

- Ensure that all providers have buy-in to planned integrative collaborations.
- Develop performance metrics for screening, caries prevention, dental sealant, etc.
- Develop a dental referral network.
- Demonstrate supportive leadership.
- Make cultural competency training available to all providers and staff.

Atchison said that a good example is from the Willamette Dental Group and the InterCommunity Health Network in Oregon, which together chose to concentrate on diabetes in response to a statewide health integration program that required organizations to develop pilot programs to address community problems. The medical and dental practices, which were separate entities, had to work together to develop a pilot program in which they would send education materials about diabetes and periodontal disease to medical patients who had diabetes. Physicians then asked patients if they had been to the dentist in the past year. If not, they had to do a referral, which was unusual; as one nurse said, "We are not used to doing referrals to dentists." At the same time, the dental clinic had to identify people with a medical history of diabetes, ask them if they had seen a physician in the past year, and if not do a referral. "It does not seem like much, but it is very difficult to change practice like that," said Atchison.

At the system level, she said that health literacy applications include the following:

- Interface with public health and community organizations.
- Determine community needs.
- Seek available resources to initiate needed programs.
- Develop and implement programs that meet the community's needs.
- Demonstrate good community-participatory governance.
- Develop a positive climate.

HealthPartners provides a good example of a health-literate application at the system level, Atchison said. When the organization realized that patients experiencing homelessness were being released from surgical care

and had no place to go where they could practice effective postoperative care, senior management arranged to pay for housing for several days.

At the functional level, Atchison said that health literacy applications include the following:

- Develop accessible, integrated electronic record systems with clinical decision tools.
- Develop systems monitoring and benchmarks.
- Apply resource management.
- Develop needed support systems and services.
- Provide regular feedback on performance.

HealthPartners's use of a patient experience questionnaire to measure patients' satisfaction is an example of functional integration, Atchison observed. Similarly, the Willamette Dental Group used common screening questions for diabetic patients and organized a communication group that ensured that all communications and outreach were tailored to the appropriate reading level and language.

Finally, at the normative level, Atchison said that health literacy applications include the following:

- Foster visionary leadership to develop a dental home initiative.
- Create a shared vision for optimal oral health for all.
- Develop a collective attitude with the community.
- Let the community come to know you are a reliable, trustworthy partner.
- Create a sense of urgency about the community's total health (including oral health).
- Build quality features of the collaboration at the operational, tactical, and strategic levels.

In the Willamette Dental Group's transformation program in Oregon, integration partners took concrete steps for the collaboration by developing goals, considering the social determinants of health, and conducting a review of physician language to determine whether patients could understand their providers. Grace Health described their mission as looking "to fill gaps in the care system" for their community, which is why they focused on pregnant women.

TRAINING AND EDUCATION OF HEALTH PROFESSIONALS

To assess the type of training and education provided to health professional students and through continuing education, Atchison and her

colleagues reviewed the published literature from 1995 to 2017, training grants funded by the Health Resources and Services Administration (HRSA), and the websites of 43 nondental health professional associations, in addition to surveying the oral health curricula in nondental profession programs and the interprofessional education curricula in dental programs, and contacting key individuals and organizations.

This environmental scan identified a number of challenges to integration of oral health and health professional education and practice, she said. First, dental education programs were severely siloed. The United States has twice as many medical schools as dental schools, and many academic health centers lack a dental school. Even where the two were co-located, challenges to coordination included different schedules, different cultures, and a lack of interest in trying to change curricula. Atchison added that before 2000, oral health was almost nonexistent in primary care provider education. It is now included in predoctoral primary care or residency training, but it still generally accounts for less than five hours in the entire curriculum, she said. Furthermore, she added, little peer-reviewed and published research has been done on either integration or patient outcomes resulting from integration.

Continuing education is critical for training professionals who are in practice and not involved in an ongoing training program such as a residency, said Atchison. But she and her colleagues found it difficult to conduct a scan on continuing education because of the difficulty of accessing and determining the content and quality of continuing education programs. Also, the joint accreditation for interprofessional continuing education includes medicine, pharmacy, and nursing but not dentistry. And of the 43 websites of nondental health professional associations that were reviewed, 42 percent had minimal or no oral health information available.

Nonetheless, favorable changes are occurring in education and training, Atchison observed. The recognition is growing that nondental health providers can have a key role in improving oral health, especially for vulnerable and underserved populations, and new curriculum initiatives, toolkits, train-the-trainer programs, and webinars have become available. She cited a number of examples, such as adding an oral assessment to the general physical examination; the development of the nurse-practitioner-dentist model; referral networks built with local dental practices; the National Interprofessional Initiative on Oral Health and the Oral Health Nursing Education and Practice; New England's Transforming Clinical Practice Initiative training programs and practices; and the online curriculum of Smiles for Life, which more than a quarter million people have been able to access. In addition, some organizations, such as the American Academy of Pediatrics, the American Academy of Physician Assistants, The Gerontological Society of America, and the Society of Teachers of Family Medicine,

have been educating their members about oral health, though this material is still not a large proportion of the curriculum.

Facilitators for education and training include the interprofessional education accreditation standards across professions, oral health integration throughout the existing primary care curriculum that goes beyond just sitting in classrooms together, interprofessional education focused on clinical activities with team-based learning among different types of professional students, networks established with local dentists for help with teaching and referrals, nondental oral health champions, university and institutional leadership, internal and external funding to initiate and sustain educational activities, and the growth of large-group, multidisciplinary delivery systems. In particular, employers want graduates to be "practice ready" to work in teams, Atchison said.

CONCLUSIONS

The integration of oral health into primary care is in its infancy, Atchison concluded. Few guidelines or published surveys exist of integration except in early childhood. Few peer-reviewed studies have been done on integration, and most of those integration programs were pilot demonstrations and did not discuss effectiveness or outcomes in improving oral and general health. Atchison added that there are some projects in development to advance interprofessional education, but few programs have yet to appear in practice. At the same time, health literacy applications also exist, but they are generally offered by accountable care organizations.

A major challenge is to work outside of managed care and accountable care organizations with the majority of dental practitioners, who are still in private practice and are not part of a network, said Atchison. "There need to be ways that we can bring those people into the network so that they are able to communicate with physicians."

3

Systems Thinking, Integration, and Health Literacy as a Catalyst[1]

The first panel was designed to foster discussion at a "high, systems level" of the link between integration and health literacy, explained moderator Dushanka Kleinman, principal associate dean, associate dean for research, and professor in the School of Public Health at the University of Maryland, College Park. Four panelists with a wealth of experience in oral health engaged in this systems thinking—Kathryn Atchison, professor at the University of California, Los Angeles (UCLA), School of Dentistry, and in the UCLA Fielding School of Public Health (whose earlier presentation was summarized in Chapter 2); Anita Glicken, associate dean and professor emerita at the University of Colorado School of Medicine and executive director of the National Interprofessional Initiative on Oral Health; Ronald Inge, chief operations officer, chief dental officer, and vice president of professional services for Delta Dental Plan of Missouri; and George Taylor, associate dean of diversity and inclusion and professor in the Department of Preventive and Restorative Dental Sciences at the University

[1] This chapter is based on presentations by Kathryn Atchison, professor at the University of California, Los Angeles (UCLA), School of Dentistry, and in the UCLA Fielding School of Public Health; Anita Glicken, associate dean and professor emerita at the University of Colorado School of Medicine and executive director of the National Interprofessional Initiative on Oral Health; Ronald Inge, chief operations officer, chief dental officer, and vice president of professional services for Delta Dental Plan of Missouri; and George Taylor, associate dean of diversity and inclusion and professor in the Department of Preventive and Restorative Dental Sciences at the University of California, San Francisco, School of Dentistry. Their statements are not endorsed or verified by the National Academies of Sciences, Engineering, and Medicine.

of California, San Francisco, School of Dentistry. The question-and-answer session following their presentations provided workshop participants with an opportunity to pose questions that would shape further discussions over the course of the day.

The panelists were asked to address the following questions:

1. From your perspective, what do you see as a new path forward toward integrating oral health with general medicine using health literacy as a catalyst?
2. Integration of health care delivery has to happen across multiple systems; given the systemic barriers and facilitators, what role can health literacy play to support integration?

INTEGRATING ORAL HEALTH WITH GENERAL MEDICINE

Taylor approached the issue of integration from the perspective of the systems that create and disseminate knowledge. Despite the scientific evidence linking oral health and general or systemic health, awareness of this evidence is limited. Statements such as "I didn't know that diabetes has an impact on oral health" are heard from many health care professionals, Taylor pointed out. Without greater awareness, efforts to integrate oral and systemic health in primary care will continue to falter.

A specific example of the lack of awareness involves the link between periodontal health and pregnancy, Taylor continued. Evidence is emerging regarding a two-way relationship between gestational diabetes mellitus (GDM) and periodontitis whereby GDM adversely affects periodontal health and periodontitis may have an adverse effect on GDM and maternal outcomes (Borgnakke et al., 2017). Furthermore, more broadly for people with type 2 diabetes, meta-analyses and systematic reviews support the idea that glycemic control is significantly improved in individuals with diabetes by receiving nonsurgical periodontal therapy and periodontitis is associated with complications of diabetes (Borgnakke et al., 2017). Using that evidence as a basis and motivation for integration could enhance programs directed toward pregnant women, Taylor observed. Additional evidence supports an association between oral health and atherosclerotic cardiovascular diseases, though that evidence is weaker than for GDM and type 2 diabetes.

Another specific example involves the geriatric population in long-term care facilities. An emerging evidence base suggests that poor oral health and factors related to oral hygiene may increase the risk for aspiration pneumonia among the elderly, which is a major adverse outcome in long-term care facilities (Liu et al., 2018).

In response to a question on the economic and overall benefits to be derived from integration, Atchison noted that pediatric dentistry has more

evidence than other areas of dentistry. In particular, the provision of oral health care before the age of 42 months can prevent devastating early childhood caries, which, if not treated, can require hospital treatment for a child. Atchison added that she was not aware of studies that followed children who received routine preventive oral health services over time to track future oral and general health care costs and savings. The need for a more comprehensive inclusion of oral health in overall health care for children is reflected in statewide health survey findings, professional oral and general health care guidelines, organizational policy statements, and recommendations from the U.S. Preventive Services Task Force and Bright Futures. "The leadership is on board for doing this, and I think that it is well ingrained in both pediatric dentists and pediatricians," Atchison said.

Lindsey Robinson from the California Dental Association suggested developing a prospective study to determine if dental services offered to patients would reduce the cost of managing chronic disease, especially in terms of hospitalizations and the use of pharmaceuticals. Such a study could also examine whether greater health literacy improves patients' ability to take better care of themselves and could inform the design of health care systems to ensure that such messages are provided consistently.

INTERPROFESSIONAL COLLABORATION

"Systems change is never easy," said Glicken, "but it is particularly difficult when we do not have a shared vision of where it is we want to go." She advocated increasing the health literacy not just of patients but of providers, payers, and others associated with oral health care and medicine to help create such a vision.

In 2007, newspapers across the country carried the story of 12-year-old Deamonte Driver, who died from the effects of an untreated tooth abscess due to dental caries. At the time, a physician, nurse, physician assistant, or pharmacist might have read the story and thought, "What a shame. Too bad they couldn't find a dentist," Glicken observed. A decade later, redefining the problem through the lens of an integrated care delivery system has made those health care providers and others an important part of the solution.

In 2009, Glicken was part of a group of innovative health leaders from medicine and dentistry who worked together with the goal of eradicating dental disease. They started from the hypothesis that integrating oral health care into the primary care practice of multiple providers (physicians, nurses, physician assistants, etc.) would create a paradigm shift that would lead to a different approach to oral health care. "We knew that this paradigm shift of putting the mouth back in the body was not going to be easy," she said. "It was going to challenge our values and many of our basic assumptions…. But we thought we could create a new standard."

The next year saw the launch of the National Interprofessional Initiative on Oral Health, which was organized around four key strategies: (1) cultivating leadership, (2) facilitating interprofessional learning and agreement, (3) developing and supporting tools and resources that bridge cultures and create a shared knowledge base and vocabulary across the health professions, and (4) working with health, medical, and dental professional organizations to try to align strategies and create actionable strategies for change. The initiative sought to create shared ownership of oral health so that the members of different professions could work together interprofessionally.

Oral health literacy has been a key lever in this work, Glicken said. It has helped to grow and change the oral health workforce. It has been preparing professionals for a paradigm shift from treatment to prevention, from individual care to population health, and from a fragmented delivery system to more integrated practice models that care not just for the mouth but for the whole person and for all people.

Kleinman pointed out that the 2000 Surgeon General's report on oral health had a similarly broad message (HHS, 2000). It focused on oral health, not just on dentistry, and one of its key messages was that promoting oral health required everyone to be involved, from individuals and caregivers at home to medical and dental health care providers to entire systems.

DESIGNING DELIVERY SYSTEMS

Integration has to go in both directions, said Inge. The message that "oral health can help on the medical side" is often repeated. But dentists have resisted integration, Inge observed. "We still have instances, too frequently, that dentists will refuse to treat a woman who is pregnant for fear of potential liabilities. To me, that is a disservice to those patients."

Inge, who works mostly with benefit designs, is part of the Delta Dental group of companies, which is responsible for the dental care benefits of more than 75 million people in the United States. It has emphasized the relationship between oral health and systemic health, but it has not been able to implement that relationship in delivery models on a large scale. While the system may provide extra benefits for a pregnant woman or someone who is diabetic, not enough information or knowledge is being disseminated as to why those benefits exist.

The challenge is largely economic, he continued. Dental benefits in the United States are driven mostly by what employers are willing to pay for with their employees. For the situation to change, decision makers, such as human resources directors, need to be convinced to change benefit plans. For example, they would need to agree to integrate oral health into those areas of general health where it has been shown to be beneficial. Change

would then need to be integrated into the care protocols of both dentists and physicians so that they have a shared responsibility and possibly a shared reimbursement.

Inge observed that dentists often ask, "How do I get paid for doing this service? If I am not going to get paid for it, then I am less likely to do it." Overcoming this resistance requires considering the economics of integration, he said, "because unfortunately, in this day and age, the economics are going to drive what services a patient receives and whether or not there is going to be collaboration between physicians and dentists." Kleinman added that this is another area where the system is well positioned and needs to disseminate knowledge from one component of the delivery system to others about the potential health benefits that exist.

In response to a question from Atchison regarding what the process of a hypothetical integrated program between Delta Dental and Blue Cross might look like, Inge recounted that, about 15 years ago, Delta Dental of Minnesota and Blue Cross/Blue Shield of Minnesota implemented a pilot program that provided dentists with screening tools for diabetes. Based on the results of those screens, additional tailored services for the patient would be covered, so greater integration is possible. The challenge, he continued, is whether employers have the mindset to take care of their employees' health as opposed to providing them with a dental benefit as an employment incentive. "There are individuals like myself who sit at every Delta Dental office and look to find ways to integrate oral health and overall health. It is in most of our mission statements. But because of our siloed position between dentistry and medicine, there is not a clear path forward," Inge stated.

Inge also noted that the marketplace has facilitators entering with access to the medical plan, the disease management program, the dental plan, and dental providers, allowing for information to pass between the systems. However, a barrier is that the systems currently speak different languages. He said,

> Even though it was a requirement that all benefit systems be able to accept codes, it stopped short of saying codes need to be used in adjudication. So for most dental benefit plans, sure, we will accept the code; it just does not do anything. We have to get to the point where it actually has an impact on what that plan design is. That is a real challenge because it means a system overhaul, which runs in the millions of dollars, and unless there is an employer who is willing to pay additionally for that, it is very difficult to move in that direction.

On this point, roundtable consultant Lawrence Smith, dean of the Donald and Barbara Zucker School of Medicine at Hofstra/Northwell

and executive vice president and physician-in-chief of Northwell Health, observed that he has been a primary care physician for 42 years, yet "I have never seen a dental record of any patient I have ever cared for. I would not even know what they looked like. I doubt I could understand them if I read them." Smith also asked about the differences in the insurance systems between dentistry and medicine, with medical insurance typically including a copay and deductible but dental insurance working very differently.

Inge agreed that a disparity exists between medical insurance and dental benefits. "You notice that I say 'dental benefits' and not 'dental insurance,' because that is the distinction." After World War II, when wages were frozen, benefits became an additional incentive for employment, and dental benefits were developed not necessarily to influence an employee's dental health but as an employment incentive. For example, Delta Dental, which was the first dental-only benefits company, started in Washington, California, and Hawaii and was for the children of longshoremen. That dental benefits plan still exists today, and it has 100 percent coverage, said Inge. "The reason for that is, if you do the actuarial analysis, only 3 to 5 percent of all people who have dental benefits actually exceed their maximum. So there is a governor there. Your out-of-pocket amount that you have to pay is the true governor of the the amount of services you will receive."

The challenge today is to shift the focus from dental services to oral health services in the context of insurance, Inge observed, with insurance reserved for catastrophic costs. He warned that many dentists may be offended by the idea, but

> our industry has gone untethered in regard to cost, and that is one of our biggest challenges now, because what you pay for a crown may be equivalent to a surgical procedure performed by a physician. Whereas if you weigh the value between those two, dollar-wise, they do not necessarily match up…. Until we can move to oral health insurance, instead of dental benefits, which is an aspiration that I hope I live to see, you are still going to have that disparity.

GETTING PEOPLE TO WORK TOGETHER

Atchison said that, as a former private practitioner, educator, and residency director, she often wonders, "How do you get people, practitioners, to work together?" Professional office buildings often have dentists and physicians in the same building, but they rarely interact. Because the predominant form of practice for dentists is still private practice, and because they rarely come into contact with physicians through their practices, the problem needs to be approached at a systems level, she said. The leadership of the professions must say, "This is important that we all work together."

Atchison recommended that all professional organizations open their continuing education programs to everyone. If the American Dental Association offered its Continuing Education Recognition Program not only to dentists and dental hygienists but to physicians and nurses, people would learn together. Sessions could even include opportunities for people to talk about what they learned and how they could operationalize this new understanding among professions.

On the topic of interprofessional collaboration, Rosof pointed out that when he was in the New York State Department of Health, dentistry was in the Department of Education, making it difficult to integrate changes based on guidelines that had been developed. "Integration has to occur at multiple levels, and clearly health literacy would help that."

THE ROLE OF HEALTH LITERACY IN INTEGRATION

Inge pointed out that health literacy enables people to get outside their comfort zones. As an example, he cited the Delta Dental plans that are partnering with large employers and their pharmacy benefit providers to identify opioid abuse within their populations. The dental plans can then provide counseling to dentists and to their members about overcoming opioid abuse. This is one of many ways in which dentistry has an opportunity to be viewed as part of the larger health care system. "We are now, for the most part, very isolated to the mouth, when we know that there is so much more that we can communicate to our patients," Inge said. In this way, dental benefits companies can go beyond what is traditional and explore opportunities to educate individuals about the links between oral health and overall health.

The value of health literacy extends across multiple dimensions, said Taylor, especially when, as Glicken pointed out, it is a two-way street between the consumers and the providers of health care (including health care payers and systems). Effective communication requires cultural humility and overcoming unconscious bias. Everyone brings assumptions to an encounter, regardless of the nature of that encounter. When a patient is meeting with a provider, signals emanate from dress, speech, grammar, and body language. With groups, relevant questions include who is paying attention, who is not paying attention, what language is used, and what kinds of questions are asked. Assumptions often will be immediate and automatic, and people need to pay attention to those assumptions and how they influence an encounter, Taylor said. These assumptions play a role in both achieving cultural competency and avoiding unconscious bias. The result can be "appropriate as well as culturally sensitive communications across the board." As Kleinman emphasized, these considerations extend across organizational levels, influencing everything from facility design and signage in a building to the ways in which staff are trained.

Belonging is another important concept, Taylor pointed out. Many dentists do not feel that they belong to the broader health care system. Interprofessional education and interprofessional practice can build that sense of belonging while improving the health of patients and populations.

INVOLVING CONSUMERS IN THE DISCUSSION

Glicken agreed about the need to expand the discussion to consider the voice of the consumer. "If we look around at some of the changes that are happening—the advances in technology and immediate accessibility of information—we are on the verge of a paradigm shift, and potentially a tsunami," she said. Health literacy can push that tsunami along, she said, while helping to produce a more consumer-oriented mindset. She recalled that in 1993, when she began teaching a course titled "Evidence-Based Medicine," she tended to get pushback from students who said things like "Why should I learn this? Nobody else is doing it. That is someone else's job." Confronted with the same body of evidence, providers would say, "Are you questioning my clinical judgment? This is my area of expertise." Policy makers and payers struggled to figure out how to integrate this new approach into paying for and managing care.

But just a few years later, students who were trained in evidence-based medicine were being praised for thinking in different ways about the practice of medicine. At the same time, patients were bringing to their providers information they saw on the Internet and asking how it applied to their situation. The same thing could happen with oral health, said Glicken. Patients need readily accessible and culturally sensitive information about their oral health. But across the health professions they also need providers and leaders who can help them figure out how to personalize that information and apply it to their own care. "I am hoping that oral health literacy is the tsunami of change that activates patients and moves us forward toward a more integrated care delivery system."

Atchison suggested working to improve health literacy through insurance-based networks. For example, if people received information on topics such as cardiovascular disease, diabetes, and other chronic diseases when they signed up for insurance, including Medicaid, they could receive information that they need to have and are not necessarily going to get from their providers. She recounted the story of a colleague's husband who wanted to have more periodontal cleanings because he had heart disease, was overweight, and had diabetes. He was told by his dentist that his insurance would pay for only two cleanings per year, though Atchison knew it would pay for three. When she wrote out the information and had him present it to his dentist, he was told that in his case insurance would pay for three cleanings. "The practice did not know. The practice did not offer it to him. We need to get information directly

to the patient … that they can use to get the care they need. That would be a health-literate message."

QUESTIONS FOR DISCUSSION

At the end of the discussion session, Kleinman called for workshop participants to provide questions that could be addressed over the course of the day as well as by the panelists. These questions were provided:

- How can consumers promote the integration of care?
- How can payment systems be reformed to drive integration?
- How can evidence of the benefits of integration be generated?
- How can oral health be included in continuing medical education?
- How can better health literacy among providers and consumers enhance integration?
- Whose responsibility is it to communicate information to providers and consumers about the link between oral health and general health?
- How can the public health system contribute to integration?
- How can dentists be encouraged to pursue integration?
- How can the existing evidence for cost savings and better health as a consequence of integration be documented, communicated, and strengthened?

4

Health Literacy and Care Integration[1]

The second panel of the workshop explored in greater depth how health literacy and care integration can act together to improve health and well-being. One scheduled speaker, Brian Hill, the founder and executive director of the Oral Cancer Foundation, suffered a medical emergency related to his long-term health issues and could not attend the workshop. Hill is a stage IV oral cancer survivor and, in the words of session moderator Alice Horowitz, research associate professor at the University of Maryland School of Public Health, "has probably done more to raise awareness about oral cancers than any other single person in the world." Horowitz noted that the workshop would miss hearing about his 20 years of experience dealing with the many things that, as he has put it, "fall through the cracks when dentistry and medicine are detached from what should be their common grounds."

THE NEED FOR PUBLIC HEALTH LITERACY

Dean Schillinger, professor of medicine in residence at the University of California, San Francisco (UCSF), and chief of the UCSF Division of General Internal Medicine at San Francisco General Hospital, opened the panel

[1] This chapter is based on presentations by Dean Schillinger, professor of medicine in residence at the University of California, San Francisco (UCSF), chief of the UCSF Division of General Internal Medicine at San Francisco General Hospital, and director of its Health Communications Research Program; and Meg Booth, executive director of the Children's General Health Project. Their statements are not endorsed or verified by the National Academies of Sciences, Engineering, and Medicine.

by discussing a particular form of literacy: public health literacy. Schillinger defined public health literacy as the degree to which individuals and groups can obtain, process, understand, evaluate, and act on information needed to make public health decisions that benefit the community (Freedman et al., 2009; Schillinger et al., 2018). The target populations for communications designed to build public health literacy are the general public and policy makers, not just patients or clinicians, and the purpose of these communications is to improve the health of the general public. The objectives of greater public health literacy are to engage more stakeholders in public health and prevention efforts—beyond clinicians, the people who are affected, and advocates—so as to better address the upstream determinants of health that drive the burden of suffering and health care costs.

Public health literacy is a multidimensional construct, Schillinger said. At its conceptual foundation is the socio-ecological model of health, a concept that has been accepted and operationalized more in Europe than in the United States. Public health literacy also requires a degree of critical skills and critical thinking—"so that one can reconcile the difference between what one sees and what one believes, and how one explains the world"—and a civic orientation based on the idea that actions not immediately beneficial to an individual will be beneficial at a later date to that individual, their families, and their community.

From the 21 recommendations in the commissioned report, Schillinger cited three that are particularly relevant to public health literacy:

- Apply a comprehensive framework that includes integration theory, oral health, primary care, and health literacy into [public health] practice, education, research, and policy making. (Schillinger said that he added the term "public health" to expand the recommendation beyond clinical practice.) (Recommendation 1)
- Prioritize oral health promotion and disease prevention in integration activities in order to reduce disparities. (Recommendation 5)
- Encourage the conduct of studies of the impact of health literacy on integration of primary oral health services into primary care and preventive health services into dentistry. (Recommendation 14)

Schillinger both expanded on and applied these recommendations particularly to vulnerable populations, which he defined, drawing on epidemiology, as subgroups of the larger population that, because of social, economic, political, structural, geographic, and/or historical forces, are exposed to greater risks and are thereby at a disadvantage with respect to their health and health care (Frolich and Potvin, 2008; Schillinger et al., 2017). He noted that this definition frames the problem as one of exposures and not behaviors, thereby eliminating some of the "shame and blame" that

is associated with the higher burden of disease in poor people. "It is not something intrinsic to the individuals that makes them socially vulnerable," he said. "It is how we have constructed our society that makes an individual socially vulnerable. You can transplant someone from one society into another and they may not be socially vulnerable in that second society."

Schillinger listed the common social vulnerabilities using an acronym (see Box 4-1). This list is not exhaustive, Schillinger acknowledged, but it covers many of the social exposures that affect health, and these social issues generally have a much greater effect on health outcomes than the health care someone receives.

These social factors are particularly influential given the limited reach of health care and dental care. Schillinger reviewed some of the numbers drawn from studies of the ecology of health care. He explained that over the course of 1 year, of 1,000 children younger than age 18, only 167 will visit a physician's office and only 82 will visit a dentist's office. He added that the comparable figures for adults ages 18 and older are just 235 and 73, respectively.

Access is even more limited for vulnerable populations. Schillinger cited the inverse care law—"access to and quality of health care is inversely proportional to the needs of the population" (Tudor-Hart, 1971)—noting

BOX 4-1
Common Social Vulnerabilities

Violence
Uninsured
Literacy and language
Neglect (to oneself or others)
Economic hardship/food insecurity
Race/ethnic discordance, discrimination
Addiction
Brain disorders (such as depression or dementia)
Immigrant
Legal status
Isolation/informal caregiving burden
Transportation problems
Illness model
Eyes and ears (that is, vision or hearing problems)
Shelter (including homelessness and housing instability)

SOURCES: Adapted from a presentation by Dean Schillinger at the workshop Integrating Oral and General Health Through Health Literacy Practices on December 6, 2018; and from King and Wheeler, 2017.

that this rule began as a hypothesis "but now it is known as a law, because it has been shown in every society to be true." Much of progressive health policy has sought to reverse or mitigate this inverse care law.

While most well studied in medical care, the inverse care law applies to oral health just as it does to physical and mental health, Schillinger observed. Among low-income adults, 42 percent have difficulty biting and chewing, 23 percent reduce participation in social activities due to the condition of their mouth and teeth, 35 percent feel embarrassment due to the condition of their mouth and teeth, and 37 percent avoid smiling due to the condition of their mouth and teeth.[2] Though 77 percent of adults say they intend to visit a dentist in the next year, the actual figures depend on income, ranging from 91 percent for high-income adults to 74 percent for middle-income adults to 62 percent for low-income adults, even though lower-income adults have greater oral health needs (Harris et al., 2015). The same observation applies to dental visits. Of the 37 percent of adults who actually visited a dentist within the past year, 51 percent of high-income adults did so, compared with 31 percent of middle-income adults and 20 percent of low-income adults. Because of low reimbursement rates and variable inclusion of dental care as part of public health insurance, Medicaid does not solve this problem for oral health, though it somewhat mitigates it.

Schillinger cited work by Thomas R. Frieden (2010), as part of his population health pyramid, showing that focusing on socioeconomic factors, changing the context to make individuals' default decisions healthy, and implementing long-lasting protective interventions have a greater impact on the overall population than do clinical interventions, counseling, and education (see Figure 4-1). In his presentation, Schillinger focused on the first two of these high-impact factors, while touching on the third.

SHARED RISK EXPOSURES AND THE CYCLE OF DISEASE: ADDED SUGAR, NONFLUORIDATED WATER

Why is public health literacy so important for the integration of oral and primary health services? Schillinger asked. First, most oral health, physical health, and mental health problems are driven by common, shared-risk exposures (Schillinger et al., 2018). As a result, these three categories of health problems are linked. "These should not be viewed as siloed health conditions," said Schillinger. "Social vulnerability, acting through differential exposures to risk and resources (including access), can impact one or more of the three dimensions of health, in interrelated fashions."

[2] These and many other measures of oral health are available at https://www.ada.org/en/science-research/health-policy-institute/oral-health-and-well-being (accessed April 23, 2019).

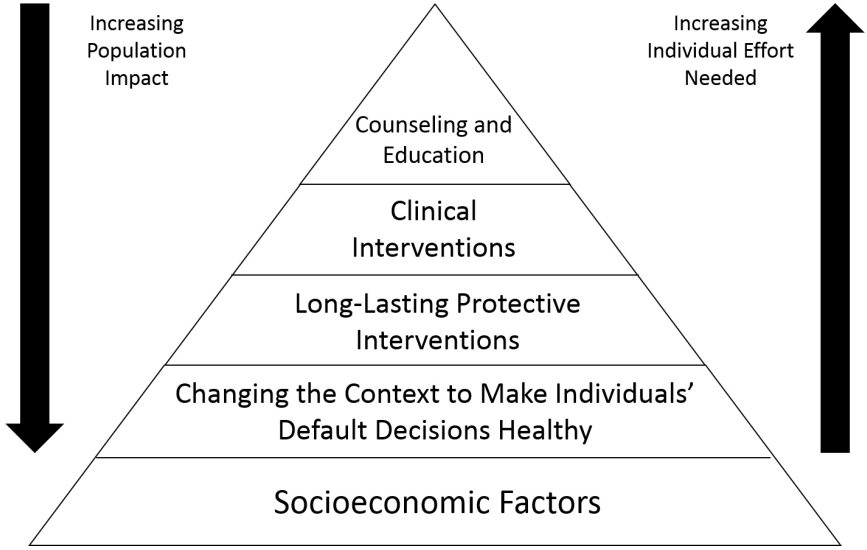

FIGURE 4-1 The health impact pyramid: A focus on the bottom three foundations. SOURCES: Adapted from a presentation by Dean Schillinger at the workshop in Integrating Oral and General Health Through Health Literacy Practices on December 6, 2018; and from Frieden, 2010.

At the same time, greater social vulnerability elevates risk exposures that jeopardize all three dimensions of health. Disease burden in any of the three domains often leads to downward economic mobility, generating greater social vulnerability and creating a vicious cycle that leads to an even greater disease burden.

As such, addressing common social determinants can prevent risk exposure and reduce health disparities across all three health dimensions. Preventing exposures to common risk factors is an efficient, clinically effective, and cost-effective approach to improving oral, physical, and mental health, Schillinger said. He added that secondary prevention, through either public health or clinical interventions, for systemic diseases or diseases of the oral cavity may yield collateral benefits across other health dimensions. Thus, secondary prevention as well as primary prevention adds value.

As an example, Schillinger pointed out that one in eight adult Americans has diabetes. Access to medical, mental, and oral health care for these and other people, whether integrated or not, is essential but insufficient. Unless public health literacy is addressed, the underlying problems will not be solved.

Schillinger provided several other examples of how preventing exposures to common and shared risk factors can be efficient, clinically effective, and cost effective:

- Diet, specifically added sugars and sugar-sweetened beverages, is a major cause of caries, periodontal disease, diabetes, cardiovascular disease, obesity, and depression.
- Nonfluoridated water can lead to tooth loss, which can lead to poor dietary quality and intake, malnutrition, and anxiety and depressive symptoms (leading to chronic illness).
- Tobacco use is much more likely in people with depression and schizophrenia, and tobacco use can lead to a wide variety of systemic diseases.
- Excess alcohol use, itself a behavioral health problem, can lead to oral health problems, cancer, liver disease, and cardiovascular disease, among other problems.

These common epidemiologic risk factors are concentrated primarily in socially vulnerable populations, Schillinger observed. He discussed as an example the correlations in San Francisco between the consumption of sugar-sweetened beverages, low income, diabetes hospitalization rates (which can differ 10-fold by neighborhood), and caries prevalence among kindergartners. Despite the existence of all these correlations, when San Francisco was debating whether to impose a tax on sugar-sweetened beverages, journalists, tax advocates, and others in news stories most often connected sugary drinks to obesity and diabetes, not to oral health (Somji et al., 2016). Though dental caries is the most prevalent chronic disease caused by consumption of sugar-sweetened beverages, diabetes was discussed 17 times and obesity 19 times more frequently than oral health consequences. When oral health appeared, it was mentioned only in passing or briefly listed among other chronic diseases.

On a related issue, Schillinger described an effort in San Francisco to pass an ordinance that would require warning labels on advertisements for sugary drinks saying, "Warning: drinking beverages with added sugar(s) contributes to obesity, diabetes, and tooth decay. This is a message from the City and County of San Francisco." Originally scheduled to go into effect in 2016, trade groups for the beverage and billboard industries claimed that such a warning would infringe on their constitutional free-speech rights and that its content was false, misleading, and scientifically controversial. Expert testimony written by the former scientific director of the American Diabetes Association claimed that there is no evidence that sugary drinks cause cavities, among other health problems. In response, Schillinger, who provided expert testimony on behalf of the city, wrote an article about

how industry had hijacked science to undermine truth and was placing the public's health at significant jeopardy (Schillinger et al., 2018). As such, promoting public health literacy related to the interrelationships between physical and oral health is critical.

Schillinger explained that another exposure that disproportionately affects vulnerable populations and their oral health is nonfluoridated water. He also noted that bottled water is the fastest growing drink choice in the United States, representing expenditures of more than $100 per year per person, and is hundreds of times more expensive than tap water. But, Schillinger added, only 15 bottled water products out of 640 represented by the International Bottled Water Association contain fluoride. "The regulatory standards on this are simply inadequate," said Schillinger. If bottled water meets specific standards from the U.S. Food and Drug Administration, manufacturers may include the following health claim: "Drinking fluoridated water may reduce the risk of [dental caries or tooth decay]." But there is no affirmative warning label to state that a bottled water does not contain fluoride. In fact, the U.S. Environmental Protection Agency only states on its website that consumers are encouraged to "check with bottlers to find out if their water contains fluoride."

The consumption of tap and bottled water differs by race, ethnicity, nativity, and education. One-third of U.S. adults drink bottled water on any given day, and non-Hispanic Blacks, Hispanics, and adults born outside of the 50 United States and Washington, DC, had 2.20, 2.37, and 1.46 times the odds, respectively, of consuming bottled water than their non-Hispanic white and U.S.-born counterparts (Rosinger et al., 2018). At the same time, non-Hispanic Black and Hispanic adults had 0.44 and 0.55 times the odds, respectively, of consuming (fluoridated) tap water compared with non-Hispanic whites. Low-income parents and caregivers of young children in Maryland rarely drink tap water and do not give it to their children; rather, they use bottled water and were found to have a limited understanding of the use of fluoride to prevent caries (Horowitz et al., 2015). Of note, Schillinger added, low-income and racial and ethnic minority populations often drink sugar-sweetened beverages at higher rates, creating synergistic risk.

Water filtration has been associated with higher odds of drinking plain or tap water, but filtration has differing effects on fluoride. Reverse osmosis, which is the most common sink-filter system, as well as distillation and active alumina filtration systems, all remove fluoride, whereas carbon filters do not remove fluoride. "This too is a public health literacy issue," said Schillinger.

The use of fluoride varnish as a long-lasting protective intervention is another public health issue, Schillinger added. If other preventive measures, like the influenza vaccine, can be available at a local drugstore rather than a health clinic, fluoride varnishes could become similarly available. "We

should really be thinking about this as a public health literacy campaign as well," he said.

Schillinger briefly listed some of the other preventable risk exposures that jeopardize all three dimensions of health. Food insecurity leads to poor dietary quality because people tend to eat calorically dense foods, which leads to caries, gum disease, tooth loss, diabetes, cardiovascular disease, obesity, stress, and depression—all from one social determinant. Domestic violence and trauma can lead to tooth loss, poor dietary quality, diabetes, posttraumatic stress disorder, and depression. Low educational attainment and limited health literacy can lead to high consumption of sugar-sweetened beverages and poor oral health; Schillinger mentioned that consumers with low health literacy drink on average 240 calories of soda per day more than those with high health literacy. Immigration status can lead to poor access to health care, which leads to problems in all three health dimensions, and poverty adds poor access to resources to poor access to care.

Greater rates of illness in any of these three dimensions can lead to downward economic mobility and greater social vulnerability. Schillinger cited newspaper stories (Frakt, 2018), books (Otto, 2017), magazines (Gaffney, 2017), and academic research that all make this point. The American Dental Association found that one-third of adults with incomes less than 138 percent of the federal poverty level—meaning that they could be eligible for Medicaid in the Patient Protection and Affordable Care Act expansion states—reported that the appearance of their teeth and mouth affected their ability to interview for a job, versus just 15 percent of people with incomes above four times the federal poverty level.[3] Another study found that fluoridation increased the earnings of women by 4 percent on average, and even more for women of low socioeconomic status (Glied and Neidell, 2008). A randomized controlled trial in Brazil, which showed employers two images of the same person, one with no dental problems and one with uncorrected teeth, found that those with dental problems were perceived to be less intelligent and less likely to be considered suitable for hiring (Pithon et al., 2014).

Finally, Schillinger mentioned the issue of secondary prevention—and specifically the interactions between diabetes, periodontitis, and depression (Kane, 2017; Preshaw et al., 2012). Hyperglycemia negatively affects oral health, increasing the risk of periodontitis three-fold along with other oral health problems, including alveolar bone loss, abscess formation, and poor healing. In turn, periodontitis negatively impacts glycemic control in diabetes and leads to inflammatory responses that accelerate complications such as heart attacks and kidney failure. Treatment of gingivitis can

[3] These and many other measures of oral health are available at https://www.ada.org/en/science-research/health-policy-institute/oral-health-and-well-being (accessed April 4, 2019).

improve glycemic control, while treatment of diabetes can improve oral health. Both tooth loss and diabetes are potent triggers for depression, and depression treatment can improve oral hygiene and diabetes control. The costs and disability related to excess care for dental and diabetes complications can have severe economic consequences, leading to stress, depression, downward income mobility, and poverty. "The economic consequences of dental problems reflect both direct (health care–related) and indirect (work productivity) costs, but are largely unstudied," said Schillinger.

COUNTERING HARMFUL COMMUNICATIONS

The messages being communicated to the public around risk factors are entirely misaligned with public health literacy principles, said Schillinger, instead focusing on personal choice and behaviors. One campaign to counter harmful communications has been undertaken by an initiative called The Bigger Picture, which encourages young people to "raise your voice and join the conversation about diabetes."[4] Four of the 25 short films created by The Bigger Picture integrate oral, physical, and mental health in their prevention messages. Schillinger particularly recommended the films *Bottled Up*, which is about the value of fresh water, and *Chocolate Smile*, which frames the disproportionate marketing and exposure of sweets to young people of color—and its physical and oral health consequences—as a social justice issue.

Public health communications and advocacy efforts need a more integrated set of messages across physical and oral health, Schillinger observed. He has been working with a group of physicians and dentists to build these skills in a program called the Champion Provider Fellowship, which is run out of UCSF and funded in part by the California Department of Public Health and the U.S. Department of Agriculture.[5] The program provides a model for harnessing public health literacy for oral and general health and is building skills for policy, systems, and environmental change. At the time of the workshop, it had 78 current Champion Provider Fellows, including 10 dentists, many of whom had years of experience in their professions.

Many other programs exist to counter the social determinants that harm health across physical and oral health domains. For example, Schillinger mentioned a program in the San Francisco area called EatSF, which provides vouchers to low-income people to buy fresh fruits and vegetables, thereby

[4] More information about the campaign is available at http://www.thebiggerpictureproject.org (accessed April 4, 2019).

[5] More information about the program is available at https://championprovider.ucsf.edu (accessed April 4, 2019).

helping to prevent chronic disease, including diabetes and diseases of the oral cavity.[6]

Schillinger concluded that public health literacy must be part of the integration equation, because access to care is helpful but insufficient. Finding the second-hand smoke equivalent that moved the public to think differently about how to respond to tobacco-related epidemic will be important for preventing interrelated physical and oral health problems. Making a public health literacy case for integration may require making the economic case related to the costs of not doing things differently. "How does it affect every American's pocketbook, either in their taxes, their insurance premiums, or their out-of-pocket expenses?" he asked. "We need to bring public health back into the equation."

HOW ORAL HEALTH LITERACY SHAPES POLICY MAKING

"No family should be held back from their dreams because of dental disease," said Meg Booth, executive director of the Children's Dental Health Project, a nonprofit organization in Washington, DC, that is based on that premise. "We work each and every day to advance innovative policy solutions so that systems changes can remove oral health as a driver of inequities."

The project works in three broad domains. It seeks to integrate oral health into the existing systems where families live, learn, and work. It seeks to remove race, income, and geography as drivers of oral health. And it seeks to make health and quality of life rather than disease burden the metrics of oral health care.

As a consumer advocate, the Children's Dental Health Project represents the interests of families rather than industry. It works with policy makers at the state and federal levels on policies that affect oral health, and in the course of that work it has come to recognize the deficiencies in how oral health advocates have talked to policy makers. In the past, they have tended to highlight the prevalence of disease, not the consequences. They have focused on utilization data, not the effectiveness or appropriateness of care. And they have rarely cited the links between oral health and the social determinants of health, including food insecurity, trauma, housing, and insurance.

"We started to ask ourselves, 'What is it that they really want to know?'" said Booth. In 2017, the project hosted a national focus group of influential community leaders, including pediatricians and state legislators, state advocates, and hospital administrators, to talk about oral health.

[6] More information about the program is available at http://eatsfvoucher.org (accessed April 4, 2019).

That conversation and other research uncovered a fundamental lack of oral health literacy not only among community policy makers but also among those who are influencing policy makers. Advocates and policy makers alike know relatively little about not only the disease burden but about the impact that poor oral health has on their communities.

Digging deeper, the project traveled in 2018 to four communities in Maine and Texas to talk with influential members of those communities, such as educators, business owners, and medical professionals. These conversations revealed that policy makers and influencers tended to overlook oral health as a system issue and viewed it instead as something that is addressed in dental offices. Most were frustrated by the wall separating medical from dental coverage and care. They also believed that the consequences of poor oral health made a more persuasive case than did disease prevalence. "Most [policy makers] … don't understand that this is a chronic disease that has to be treated on an ongoing basis," said a member of one focus group. We "need to make the case better about not only health care costs but the cost [of dental disease] to society," said another. "I don't think dental care is often talked about as a chronic disease. I mean, that is a very strong word," was a third representative remark.

On the need for risk assessments, one focus group participant said, "Isn't prevention always the better tool? How many times are we learning that lesson?" Another, referring to the interest of state legislators in job creation, remarked, "So, if you were to say, 'these guys can't get a job because their teeth are holding them back,' that's going to make a big difference." A third remarked with astonishment, "Is this true about the soldiers not being deployable? Wow." People who are concerned about oral health have delivered these messages in the past, said Booth, but they appear not to have been resonating at the community level.

Booth pointed out that the impacts of oral health are felt across the life span in such areas as social function, education, economic mobility, employment, and overall health. The Children's Dental Health Project has used these impacts to craft messages about the consequences of oral health. The appearance of the mouth and teeth can impact confidence and mental state, the project points out. Booth added:

> Working mothers with better oral health earn 4.5 percent higher wages—a statistic made even more salient since more than half of women are the sole or primary breadwinners of their families, including 70 percent of African American women. Children sitting in a classroom in pain have a harder time learning, and dental disease has consequences for longer-term education and employment. Children with poor dental health are three times more likely to miss school and more likely to earn lower grades. Some research links gum disease with adverse birth outcomes. The comorbidities

of oral health, including diabetes and pneumonia in older adults, along with quality of life issues and long-term health costs are all considerations.

The separation of the payment systems for dental care and medical care restricts the ability to look at the impact and the incentives for integration of oral health and primary care, Booth observed. For example, about 80 percent of children in Medicaid below the age of 3 get a well-child visit, but only 20 percent get a dental visit for preventive services. She added that even though fluoride varnish is reimbursed by Medicaid programs in every state, and even though policies are in place to assess children for risk, only about 10 percent of children in the Medicaid program ages 1 and 2 get any type of preventive service from a nondental professional. The rigidity of the dental care system—with its 6-month visit and fairly rigid service limits, separate financing and delivery, separate electronic records, and reimbursement that emphasizes treatment—can be limiting, Booth said. "We are hamstringing ourselves."

CREATING A PATHWAY TO SOLUTIONS

Booth cited three examples of "low-hanging fruit" for clinical integration: oral health risk assessment, care coordination, and benefit design. Higher reach opportunities for systems integration, which are "more daunting," she said, include measurement, payment for health outcomes, and electronic health records. "Without the ability to track across the systems, we are always going to have an uphill battle."

The barriers can quickly become overwhelming for policy makers unless they have a clear path in front of them. Advocates need to take the time to talk with partners outside health care systems to make a broader case for systems change, she said. Booth also noted that primary care is increasingly addressing the social determinants of health beyond a clinical setting. Professionals should ask how oral health literacy can be built into (not outside of) that conversation, she said. How can high-impact, minimally invasive interventions be provided in settings where people live, work, learn, and play?

Booth concluded, "Oral health is intended to be a means to health—an opportunity and not an end point. We need to focus on how we might bring oral health into systems and touchpoints that exist for families and children beyond clinical settings, whether it is early childhood education, social programs, job readiness programs."

ORGANIZING A PUBLIC HEALTH LITERACY CAMPAIGN

When asked by Horowitz about how health literacy can address disparities in both access to care and health outcomes, Booth replied that this is the case that needs to be made when talking with policy makers. Rather than talking just about the prevalence of disease, the emphasis needs to be on how oral health has created larger disparities in such areas as economic mobility. "What are the driving forces behind that? Is it how we teach? Is it how we pay for care? There are different ways that we can address the issue to point out oral health as part of a larger system instead of just focusing on the disease burden."

By talking about the consequences of oral health, Schillinger added, advocates also benefit people concerned about diabetes, heart disease, stroke, and other conditions. "It is a win-win," he said. "You are getting a lot of constituent buy-in and are engaging more advocacy organizations by working on this in this way."

Booth recalled having a conversation with a state advocate about an oral health policy where the advocate was very focused on what could be accomplished. "You can accomplish more," she replied. "You should push the envelope." Dentists are clearly allies, but so are members of the early childhood community, brain researchers, and other groups. "You need to start rallying the troops," she said.

> Showing state legislators that the 0-to-3 brain science people are on board with dental benefits in a different way for young kids is a more powerful tool than walking in just with the dental society and with an oral health advocate. Getting people to start thinking about who else is impacted by the policy change you are trying to seek is going to be more fruitful moving forward.

She also described a recent Medicaid waiver that went through for adults in Kentucky with work requirements and other features that would act to restrict access to all health services. The waiver was designed to free up funds for, as Booth described it, vision services, dental services, over-the-counter medications, and gym memberships. "So, at this point in time, oral health services are equal to a gym membership in the eyes of many policy makers. And while I think a gym membership is great, I am not sure that it falls under the same category as trying to control diabetes." Yet, undervaluing oral health is a consequence of keeping dental services siloed from the rest of the health system, she said.

In response to another question from Horowitz about how to encourage the conduct of studies on the impact of health literacy on integration, Schillinger discussed several research gaps. One pressing need is to get a handle on the potential costs and potential benefits of integration, which

could be done with modeling studies. As an example, he cited a current evaluation of the impact of the soda taxes in Berkeley, Oakland, and San Francisco compared with Los Angeles, which is not taxed, to estimate how changes in consumption affect a range of diabetes outcomes. Of note, this study does not include oral health problems and costs. A similar study to determine the costs and benefits of public health interventions that impact common shared risk factors could make a powerful case to policy makers about the benefits of integration.

He also recommended research on how messages are communicated to stakeholders, including the general public and policy makers, on integration. People still do not understand that oral disease is a chronic disease with serious consequences. What words resonate with different audiences, he asked: cavities, gum disease, tooth loss?

Greater communication could also spur major changes in the clinical domain. For example, people should be coming into dental offices and asking for fluoride varnish, he said. He recalled a recent encounter with a patient with heart disease and diabetes who asked, "Aren't you going to put me on a statin?" which reflected an "amazing" level of knowledge about her condition. Greater communication could "activate the general public around fluoride varnish as a basic health care right," he said.

Another issue that brings public health and clinical care together is fluoridated water, Schillinger observed. Today, a countercultural movement has grown up around fear of fluoride—one best-selling toothpaste brand displays prominently on its packaging that it is fluoride free.

> How do we, in clinical settings and in public health campaigns, talk about fluoride in a different way, [without being] seen as the mouthpieces of "the nanny state?" We should be telling our patients who insist on drinking bottled water which of the bottled waters have fluoride in them. We should be encouraging them to drink tap water. And we need to figure out how to best communicate to low-income populations, who have real fear around drinking tap water, often for really good reasons.

An even more fundamental problem is related to where people can get treatment for the consequences of oral disease. If patients with diabetes have no place to get oral health treatment, diagnosing their problems is not sufficient. Access to care remains "a huge barrier," he said.

WHERE SHOULD ORAL HEALTH BE DELIVERED?

Roundtable member Michael McKee, assistant professor of family medicine at the University of Michigan Medical School, noted how useful it is to get an overview of the influences of oral health on general health.

However, much of the focus had been on relying on primary care physicians to deliver oral health, he said, and "we are, right now, overwhelmed, we are overtasked." Dentistry is a "rather affluent profession, and primary care providers make a lot less than dentists do," he said, adding that he was "struggling with this business model." For instance, his clinic is an avid proponent of fluoride varnish and is doing the procedures. But "it is not easy to incorporate it into our daily practice," he said. "We are reimbursed roughly $8 to $10 for doing this varnish, which is on top of everything that we do. We are averaging five or six clinical problems and then we have this varnish expectation," with even the dental school approaching primary care physicians to address the gaps that exist.

McKee challenged dentists to "own up and address these gaps in oral health." Rather than expecting primary care physicians to do more and more to address health disparities, clinical care delivery needs to be assumed by dentistry as well. "We need to get them at the places where there are gaps.... We need to also be realistic about the expectations and where the burdens are and make sure that they are shared and fairly distributed."

Booth began her response by recognizing the amount of work that happens in a pediatrician's office—"even when I just witness my own children going to the pediatrician." She then made two points. First, ways need to be found to reimburse primary care settings adequately to create time and space for such procedures because pediatricians have a natural ability to do them, "probably more so than a dentist." Pediatricians are already aware of the common risk factors that their patients face, but the current system is inadequate to address those risk factors.

The second point she made is that clinical providers are not needed to address one of the greatest unmet needs, which is identifying children at highest risk for caries and getting them into a management protocol. Families of children at even the youngest ages can be reached in many different ways in order to conduct an oral health risk assessment. Many people who see families every day have a sense of the risks facing those families, and these people could be trusted intermediaries who can get information from and to families. "Kids are not in physicians' offices every day," she said. "They are in child care settings. They are in [Special Supplemental Nutrition Program for Women, Infants, and Children (WIC)] clinics. They are in many different places that could serve as the entry point into whatever a management protocol would be." This would be a better option than relying on the handful of clinicians that families see on only an occasional basis.

Schillinger, too, said that "as a primary care doctor, I completely validate what you are saying." Furthermore, relying entirely on primary care physicians is inadequate not just for oral health but for other areas of health care, such as mental health. "The individual doc model does not work," he said. "We have to move to team-based care." Payment mechanisms are

needed to do that, he observed, as are other health professionals who have the necessary skills. "We are not talking about drilling and root canals in primary care. We are talking about things like behavioral health integration." He now has a behaviorist in his clinic, and the change has been "amazing," he said. "Now I have expectations around behavioral health that I did not have before."

FOSTERING PREVENTIVE INTERVENTIONS

In response to a question about how fluoride varnish applications can be more widely used, Booth described the situation in California as the best example. Almost anyone in California can apply varnish without worrying about credentialing issues. Companies can mail varnish to adults who want to do it themselves, and applying varnish is not a difficult thing to do, she said. Susan Fisher-Owens, clinical professor of pediatrics in the UCSF School of Medicine and associate clinical professor of preventive and restorative dental sciences in the UCSF School of Dentistry, who served as a moderator later in the workshop, elaborated that California is working on initiatives that would take varnish to children in different ways, such as through WIC and Head Start sites. They are also training different professionals, such as teachers, to apply fluoride varnish. "The skill itself is simple," she said. "I taught my 5-year-old to do it. So now when I train other providers, I say, 'If you have the skills of a 5-year-old, you too can do this application which can be a major benefit to our children.'" Furthermore, varnish can be applied multiple times without causing problems. In California, it is covered three times per year in medical care and twice per year in dental care, and additional treatments do not cause any sign of problems such as fluorosis. Fisher-Owens mentioned "a hypothetical risk of the allergy to colophony, which is part of the resin." But her medical practice has done the treatment more than 10,000 times and has never had a problem. Questions remain about reimbursement, because now the treatments are being covered in pilot projects, but efforts are under way to integrate it into federally qualified health center billing.

Jennifer Dillaha, medical director for immunizations and medical advisor for health literacy and communication at the Arkansas Department of Health, asked about human papillomavirus (HPV) vaccinations as a primary prevention for oral cancer. If immunization could be integrated into medical care, providers could write a prescription, and the pharmacist would fill it and provide the immunization. Furthermore, health literacy is a major consideration because dentists need to be able to communicate with patients about the HPV vaccination, just as any other health care provider would be able to communicate about vaccination.

Schillinger responded that he had diagnosed a young man with cancer of the base of the tongue, stemming from HPV, just 2 weeks earlier. "Pri-

mary care providers do not know about this problem," even though it is a major cause of head and neck cancer. "Maybe they know about Michael Douglas's cancer, and that is an opportunity. But we need to improve health literacy simply around this collateral benefit.... If we are focusing on health literacy to make the link that the same virus that causes cervical cancer is causing head and neck cancer, oral cancers, it would be a very big accomplishment."

Jane Grover, director of the Council on Access Prevention and Interprofessional Relations at the American Dental Association (ADA), noted that the ADA has a policy on HPV education and has enthusiastically supported application of topical fluoride varnish in a variety of settings. "We applaud the opportunity to work with physician colleagues and promote oral health and prevention of disease." She noted that before coming to the ADA she was at a community health center for 12 years, and such centers act as living laboratories and networks for medical–dental integration. For example, a community dental health coordinator program developed out of community health centers and is spreading across the country.

Gayle Mathe, director of community health policy and programs at the California Dental Association, noted that the dental association in California has been working for years to advocate with policy makers for more oral health research. She also noted that many stakeholders came together to advocate for the tobacco tax instituted in 2016 that is now funding activities in the state Office of Oral Health, including the establishment of "an oral health public infrastructure that never existed in California." Much of that funding is going to local health departments to do on-the-ground work. This success was the product of an interprofessional and cross-cultural group of advocates, and it is being closely watched to determine its effects.

Suzanne Bakken, alumni professor of nursing and professor of biomedical informatics at Columbia University, asked about the extent to which oral health has been integrated into the All of Us initiative, which is doing broad data collection on all types of health issues.[7] Workshop participant Martha Somerman, director of the National Institute of Dental and Craniofacial Research, said that the institute was involved in the early stages of compiling survey questions. As the survey was narrowed, the questions on oral health were reduced, but the current version of the survey does contain questions about oral health. Schillinger asked whether biological samples would be gathered as part of the project, and Somerman responded that blood is still the principal biological sample, but with young children, for whom blood draws are more difficult, salivary samples are planned.

[7] More information on the All of Us research program is available at https://allofus.nih.gov (accessed April 4, 2019).

In response to a comment about how to encourage people to engage in preventive activities that are not necessarily pleasurable, Booth made the point that dentistry has changed over the years. Practices have evolved so that dentistry is no longer painful or intimidating for children. They "watch videos. There are fish. There is a cool dentist there. Awesome things happen." When children begin going to the dentist early and get used to having people probing in their mouths, they are not fearful.

Nicole Holland, assistant professor and director of health communication, education, and promotion at the Tufts University School of Dental Medicine, closed the discussion by pointing to the many research opportunities that exist, not only with respect to the messages that are conveyed but the messengers who convey those messages and how they are interpreted by and influence different audiences. As Horowitz concluded, "Research funding is what we need."

5

Exploring Pathways to Integration[1]

The third session of the workshop was on pathways for integrating oral health into systemic health. Research has shown that preventive oral health services save money over the course of a childhood, observed moderator Susan Fisher-Owens, clinical professor of pediatrics at the University of California, San Francisco (UCSF), School of Medicine, and clinical professor of preventive and restorative dental sciences in the UCSF School of Dentistry. But these preventive oral health services can take many different forms. The speakers in the panel she moderated, which featured a variety of oral health programs, were among those who had "caught the integration bug," Fisher-Owens said. She encouraged the workshop participants to spread it to others. "We want to spread this 'infection' throughout our colleagues so we can work together. It's a positive epidemic."

A FEDERAL INFRASTRUCTURE

The federal government has an opportunity to serve as an infrastructure for integration, said Renée Joskow, chief dental officer for the Health

[1] This chapter is based on presentations by Renée Joskow, chief dental officer for the Health Resources and Services Administration; Amit Acharya, executive director of the Research Institute at the Marshfield Clinic Health System and chief dental informatics officer for the Family Health Center of Marshfield Inc.; John Snyder, executive dental director and chief executive officer of Permanente Dental Associates; and Kelly Close, early childhood oral health coordinator for the Oral Health Section of the North Carolina Division of Public Health. Their statements are not endorsed or verified by the National Academies of Sciences, Engineering, and Medicine.

Resources and Services Administration (HRSA). Such an infrastructure can allow for integration to occur along many pathways, creating a continuum for moving forward based on the past.

The concepts of both integration and health literacy are not new, Joskow noted. In the 1800s, dentistry was a specialty of medicine, and some physicians taught it that way. But other medical school faculties did not agree with this approach, which contributed to the separation between dental education and general health care that exists today.

Taking "a 30,000-foot view," Joskow discussed the Oral Health Strategic Framework of the U.S. Department of Health and Human Services (HHS, 2014a). The report was the product of the U.S. Public Health Service's Oral Health Coordinating Committee (OHCC), which consisted of representatives from HHS and other federal agencies. The HHS operating and staff divisions that contributed to the framework were the Administration for Community Living, the Administration for Children and Families, the Agency for Healthcare Research and Quality, the Centers for Disease Control and Prevention, the Centers for Medicare & Medicaid Services, the Food and Drug Administration, HRSA, the Indian Health Service, the National Institutes of Health, the Office for Civil Rights, the Office of the Assistant Secretary for Health, the Office of the Assistant Secretary for Planning and Evaluation, the Office of Minority Health, the Office on Women's Health, and the Substance Abuse and Mental Health Services Administration. Other contributing federal agencies included the Federal Bureau of Prisons, the Immigration and Customs Enforcement Health Service Corps, and the U.S. Coast Guard.

The report established five overarching goals:

1. Integrate oral health and primary health care.
2. Prevent disease and promote oral health.
3. Increase access to oral health care and eliminate disparities.
4. Increase the dissemination of oral health information and improve health literacy.
5. Advance oral health in public policy and research.

Joskow focused her remarks on two of those goals: integrating oral health and primary care, and increasing the dissemination of oral health information and improving health literacy. The report established four strategies for achieving the first goal:

1. Advance interprofessional collaborative practice and bidirectional sharing of clinical information to improve overall health outcomes.
2. Promote education and training to increase knowledge, attitudes, and skills that demonstrate proficiency and competency in oral health among primary care providers.

3. Support the development of policies and practices to reconnect the mouth and the body and inform decision making across all HHS programs and activities.
4. Create programs and support innovation using a systems change approach that facilitates a unified patient-centered health home.

In turn, these strategies can be linked to recommendations from two Institute of Medicine[2] (IOM) reports on oral health (IOM, 2011a,b), which also recommended integrating oral health and primary care. People studying this issue should "not forget about all the good work and the important … documents and workshops like this one that have come before."

Joskow directed attention to the first of these four strategies, as she has been heavily involved in efforts aimed at the bidirectional sharing of clinical information to improve health outcomes. "It's not taking oral health and dropping it into a medical environment," she said. "We need to practice what we preach. We need to embody the principles of integration. We need to be discussing the issues and working with these issues as integrated teams."

With regard to the fourth of the five goals, on disseminating oral health information and improving health literacy, she cited five strategies from the report:

1. Enhance data value by making data easier to access and use for public health decision making through the development of standardized oral health measures and advancement of surveillance.
2. Improve the oral health literacy of health professionals through use of evidence-based methods.
3. Improve the oral health literacy of patients and families by developing and promoting clear and consistent oral health messaging to health care providers and the public.
4. Assess the health literacy environment of patient care settings.
5. Integrate dental, medical, and behavioral health information into electronic health records.

The OHCC report contained many examples and objectives from the participating federal agencies. For example, on the fourth goal, the Administration for Community Living, which includes the Administration on Aging, proposed to undertake an oral health literacy and education effort

[2] As of March 2016, the Health and Medicine Division of the National Academies of Sciences, Engineering, and Medicine continues the consensus studies and convening activities previously carried out by the Institute of Medicine (IOM). The IOM name is used to refer to publications issued prior to July 2015.

directed toward older adults, caregivers, communities, and health professionals. Educational materials developed within the initiative, which provides evidence-based health messaging driven by the needs identified for older adults, is available on the HRSA Oral Health webpage in addition to the National Institutes of Health/National Institute of Dental and Craniofacial Research webpage.[3]

ACTIVITIES WITHIN HRSA

Integration has been a bedrock of HRSA's activities over many years, said Joskow. She presented the five strategic goals for the agency:

1. Improve access to quality health care and services.
2. Strengthen the health workforce.
3. Build healthy communities.
4. Improve health equity.
5. Strengthen HRSA program management and operations.

All of these goals are related to integrating oral health and primary care. For example, Joskow mentioned a contract between HRSA and the American Academy of Pediatrics to develop a curriculum for learning about oral health integration in primary care practices for children.[4] She also described work at the practice interface of interprofessional education, in which HRSA served as a convener and a provider of infrastructure.

Joskow said that HRSA, responding to recommendations in the two 2011 IOM reports, worked to develop interprofessional oral health core clinical competencies for safety net settings in three phases: competency development, systems approach and analysis, and implementation strategies. The competencies had five major domains: risk assessment, oral health evaluation, preventive interventions, communication and education, and interprofessional collaborative practice. A particularly important step has been implementation, in which three most-influential systems have risen to the fore: the health care system, the financing system, and professional associations—all within the overarching context of communication. For example, one of the recommendations of the report *Integration of Oral Health and Primary Care Practice* was to "develop infrastructure that is interoperable, accessible across clinical settings, and enhances adoption of the oral health core clinical competencies" (HHS, 2014b). Under this recommendation, the following actions were recommended:

[3] The page is available at https://www.hrsa.gov/oral-health (accessed April 4, 2019).

[4] The curriculum is available at https://www.hrsa.gov/sites/default/files/hrsa/oralhealth/oralhealthprimarychildren.pdf (accessed April 4, 2019).

- Engage and educate consumers about oral health in primary care as an expected standard of interprofessional practice.
- Evaluate the effectiveness of the application of the oral health core clinical competencies by assessing patient satisfaction and health outcomes.

"It's the public who we're interfacing with, whether it's at a community or individual level," Joskow observed. Patients may be surprised when a primary care provider asks them whether their gums have been bleeding or if they have problems chewing. But such questions are an opportunity, as a colleague of Joskow's has put it, "to teach them that their mouth is connected" to the rest of their body.

Joskow also called attention to the recommendation about developing an interoperable and accessible system. Payment modifications and incentives will be a major part of meeting this recommendation, which in turn points to the critical importance of building partnerships and coalitions to educate policy makers. "They're an important part of the team," she said.

HRSA has been continuing to invest in this area. Joskow mentioned three projects it has been funding. One is testing the competencies in health centers through a pilot program with the National Network for Oral Health Access, which has resulted in a user guide for implementation of the interprofessional oral health core clinical competencies (NNOHA, 2015). From the pilot-testing level, this initiative has progressed to demonstration projects in health centers and to the state level through funding to the National Maternal and Child Oral Health Resource Center.

HRSA has also been striving to disseminate the results of its work in a culturally competent way. As part of this effort, it provides materials designed to enable health care providers to recognize and address the unique culture, language, and literacy of diverse consumers and communities.[5] More broadly at HHS, the Office of Minority Health has developed a curriculum on cultural competency that provides continuing education credits, including a curriculum for oral health providers.[6]

Joskow noted that HRSA addresses oral health, access to care, and health workforce education in a multitude of programs and activities across the agency. As an indication of the breadth of its concern, Joskow pointed to some of the advisory committees that serve HRSA in ways connected to oral health. The Advisory Committee on Training in Primary Care Medicine and Dentistry, which has produced a series of reports related to integra-

[5] More information about these materials is available at https://www.hrsa.gov/culturalcompetence (accessed April 4, 2019).

[6] More information about these programs is available at https://www.thinkculturalhealth.hhs.gov (accessed April 4, 2019).

tion, and the Advisory Committee on Interdisciplinary Community-Based Linkages are among the groups that provide the Secretary of HHS with advice related to integration.[7] In addition, HRSA has conducted webinars on topics related to integration, including a webinar on integrating oral health and behavioral health in primary care settings.

"We need to build upon what currently exists," Joskow concluded.

> We have to be connecting all professions and caregivers, communities, and individuals to ensure that we employ appropriately crafted messages and we move toward fully integrated models of care, and not keep reinventing the wheel. Our health and that of the communities we serve and those in those communities where we live all depend upon it.

DRIVING INTEGRATION THROUGH COMBINED ELECTRONIC HEALTH RECORDS

Amit Acharya, executive director of the Marshfield Clinic Research Institute at the Marshfield Clinic Health System and chief dental informatics officer for the Family Health Center of Marshfield, said that he is a clinician who has been infected by the passion to integrate medical and dental care and to use the results of research to improve clinical care.

The Marshfield Clinic Health System is a large physician group practice of more than 1,000 providers that started in 1916. It has 55 clinical locations in 34 communities in central Wisconsin, including 10 dental clinics. It serves more than 300,000 unique patients and has about 3.5 million encounters annually. It is also a medical campus academic location for the University of Wisconsin School of Medicine and Public Health.

One of its guiding principles has been to make sure that it provides all types of medical specialties to the people it serves. As part of that principle, it has sought to operationalize the Surgeon General's pronouncement that oral health is essential to general health and well-being (HHS, 2000). A key priority, in addition to regionalizing care and eliminating health disparities, has been to foster medical–dental collaboration through a combined electronic health record with decision support capabilities.

In 2018, the 10 federally qualified health centers in the system provided dental services to more than 58,000 people from all of Wisconsin's 72 counties, with about 165,000 unique patients being treated by family health center dental operations since the program began in 2002. Most of the 40 or so dentists in the centers are general dentists, with a similar number of

[7] More information about these committees is available at https://www.hrsa.gov/about/organization/committees.html (accessed April 4, 2019).

dental hygienists and a larger number of support staff. At this point, the dental care system is close to full capacity, said Acharya.

In terms of health literacy, the system's service area is fairly rural, with an older population and levels of uninsured care running at about 10 to 15 percent of patients. The literacy level is relatively low compared to other areas, which makes moving to preventive care more difficult.

Given the influence of oral health in a wide variety of diseases, including heart disease, stroke, diabetes, obesity, adverse pregnancy outcomes, chronic kidney disease, and others, working with physician care teams is critical, Acharya said. "All of the health care professionals need to come together, because we need to look at this from the patient's perspective."

One immediate need was for better ways to exchange patients' information among medical and dental providers. Almost 90 percent of the 165,000 patients seen in the system's dental centers are the health system's medical patients as well. Until 2010, medical and dental records were on separate systems that were not synchronized, which can compromise quality and safety through inconsistencies and discrepancies, said Acharya. Even though medical and dental providers often rely on the same information, it was largely the responsibility of patients to make sure that their medical and dental providers were well informed.

The Marshfield Clinic Health System has emphasized informatics for decades, with its first telehealth project occurring in the 1950s and various informatics initiatives starting in the 1960s. Continuing this tradition, the Integrated Medical-Dental Electronic Health Record went live in 2010. The new approach was based on research studies of what the system's providers needed to deliver better care (Acharya et al., 2017). For example, when asked whether it was important for them to have access to dental information to provide effective medical care, 75 percent of family medicine providers said yes, followed by 64 percent of pediatricians and oncologists, 61 percent of urgent care providers, 60 percent of cardiologists, 46 percent of neurologists, and 44 percent of obstetrics/gynecology providers. When asked what dental information medical providers would like to access in a combined electronic health record, 62 percent said oral health status, followed by treatment plan (58 percent), dental problems list (56 percent), dental diagnosis (54 percent), dental history (46 percent), dental alerts (45 percent), dental appointments (30 percent), progress notes (29 percent), dental radiographs (13 percent), and odontograms (9 percent).

Integration of the two systems is still ongoing, said Acharya, but the goal is a seamless system. Indeed, he suggested not even using the word *integration*, because it suggests that two different things are being integrated.

Part of the system is a summary of oral health status and treatment for medical providers that lists, by the end of the day that a dental appoint-

ment occurred, who the dental provider was, the reason for the visit, the periodontal health status, and the treatment plan. Dentists, who are used to thinking in terms of the Code on Dental Procedures and Nomenclature (CDT), can be challenged to think in terms of dental diagnoses, but physicians are accustomed to looking at diagnoses, making it important to include that information in the integrated record (Shimpi et al., 2018). For their part, dentists have access to the same information that physicians see, including active medications, allergies, and problem lists.

Once a diagnosis is made and entered into the record, clicking on an information button leads to patient education materials. Acharya commented that this information has also proven useful to physicians who want to know more about how a dental condition is related to a patient's systemic condition. Similarly, he added, appointments and prescribing are centralized, with an e-prescribing application available to both dentists and physicians. Even where dental patients are not medical patients, prescription information is reconciled and put into the integrated record. Finally, after-visit summaries that are made available to patients also go in the electronic record (Horowitz et al., 2014). As of the workshop, the health system had been able to provide an integrated electronic health record to more than 140,000 of its patients. Acharya particularly thanked Delta Dental of Wisconsin for its support in setting up the system.

USING AN INTEGRATED ELECTRONIC HEALTH RECORD TO CHANGE PRACTICE

Acharya used the example of diabetes to demonstrate how the integrated record is being implemented. The record provides oral exam alerts for all diabetic patients, which are also useful as part of meaningful use. The exam can be done by physicians, dentists, or other providers. "It's a care team approach. We don't necessarily say who needs to do it, but as part of that team they take care of it for the patients."

This information is in turn used to decide whether to make a referral for a patient. If the referral is internal, the department receiving the referral will follow up with the patient. If the referral is external, the system's referral center will process the referral and ensure that the appointment is scheduled.

Screening for undiagnosed diabetes at the dental center results in alerts for blood glucose screening if patients meet certain criteria. Besides producing information that physicians can use, the screening process provides information for dental providers. A study of such screening found that it was easily implementable in a dental setting (Acharya et al., 2018). Alerts and referrals can even be generated using routinely collected dental data without a blood glucose measurement.

The integrated electronic health record is also a "gold mine" for research, said Acharya. It has produced a comprehensive data warehouse with about 10 million patient-years of data that can be used to support business and biomedical research queries. For example, the Marshfield Clinic Health System was involved in a physician group practice demonstration project under the Centers for Medicare & Medicaid Services that has helped to save close to $100 million from coordinated treatment of chronic conditions. The availability of medical and dental data is now enabling several oral-systemic studies, which are contributing to further the quality improvement initiatives. And oral health data have been incorporated into provider dashboards to improve the quality of care.

Acharya recounted the experiences of a patient who was referred to a dental center by his Marshfield Clinic oncologist. His cancer treatments were negatively affecting his oral health status, and as a result he began losing weight. The patient was initially scheduled for an emergency visit and follow-up dental care. All of his teeth needed to be extracted, and he was fitted for dentures. To date, the patient has improved oral health and has gained 10 pounds.

Acharya also cited a dentist colleague who quoted a patient as saying, "I thought that it seemed dumb that you would take blood pressure at the dentist office, until I had a friend of mine come here and you guys took his blood pressure in hygiene and wouldn't even see him. You sent him right over to the emergency room. Good thing you did. They took him into emergency surgery. I guess they said he was ready to pop."

Though the challenges and opportunities are ongoing, diligence pays off, Acharya concluded.

Nicole Holland asked Acharya about what should be in electronic health records for dentists and physicians. Between 50 and 60 percent of the information in an electronic health record would be common to the records of both a dental and medical practice, answered Acharya, who had previously done a study of electronic and paper records for both dental care and medical care. He also mentioned, in response to a question from Holland, that providers in the Marshfield Clinic Health System have access to prescription histories and have been looking at retrospective data to examine past practices.

INTEGRATING ORAL HEALTH AND PRIMARY CARE AT KAISER PERMANENTE

The philosophy of Permanente Dental Associates (PDA) is that it will provide ethical, evidence-based, and integrated care, where integrated means considering the total health of its patients, said John Snyder, the organization's executive dental director and chief executive officer.

On a more pragmatic level, PDA faced the challenge of integrating dentistry into the primary care setting, despite the fact that primary care physicians are incredibly busy. The approach that worked was to demonstrate that integrated dental care could help physicians do their jobs, including getting paid for their jobs.

PDA is part of a vertically integrated system, from an insurer to physicians to oral health providers. It has a contractual agreement with the broader group that provides a per member, per month global payment. It has 21 offices extending from Eugene, Oregon, to Longview, Washington; about 170 dentists; and about 287,000 patients. It provides both general and specialty care, emergency and urgent care, and Saturday appointments for dental cleanings at select locations.

PDA started taking blood pressure measurements and providing its patients with advice slips in the 1980s. In the 1990s it began doing passive referrals to health monitors, and in the 2000s it began closing preventive care gaps. As an example of this work, PDA has trained its dentists to do the first three As of tobacco cessation—ask whether patients smoke, advise them that smoking is bad for their teeth and gums, and assess whether they are thinking about quitting—after which patients can be urged to talk with tobacco cessation specialists.

Because most of PDA's patients have both medical and dental insurance through Kaiser Permanente, the dentists have access to medical information that they can use to identify care gaps. In this way, oral health providers can act as extenders of primary care to improve health outcomes while also learning more about approaches that have proven effective in medicine, such as value-based reimbursement, care teams, and medical homes. The care gap reports are written in a patient-friendly manner so that patients can understand exactly what their provider is recommending. "I teased the dentists in our group. I said, 'If you want to be called *doctor*, you better engage in the health care system,'" Snyder recounted.

As a measure of success in closing these care gaps, Snyder pointed to the approximately 9,000 patients with diabetes under PDA's care. Over the course of 2018, PDA closed care gaps for 60 percent of the patients in terms of having them get vision tests, urinalyses, and hemoglobin A1C screening (see Figure 5-1). Among those with a recent dental-only visit, 65 percent had their care gaps closed. "Our whole education is based on preventing disease, so we can be really good at it," said Snyder.

At the end of 2016, PDA went live with a fully integrated electronic health records system that has interfaces to dental care, pharmacy, social workers, care managers, and other parts of the health care system. It has been a "huge game changer," said Snyder; "we don't even know the full capability" of the system. It provides best practice advisories that require some sort of action, such as acknowledging that action has been taken.

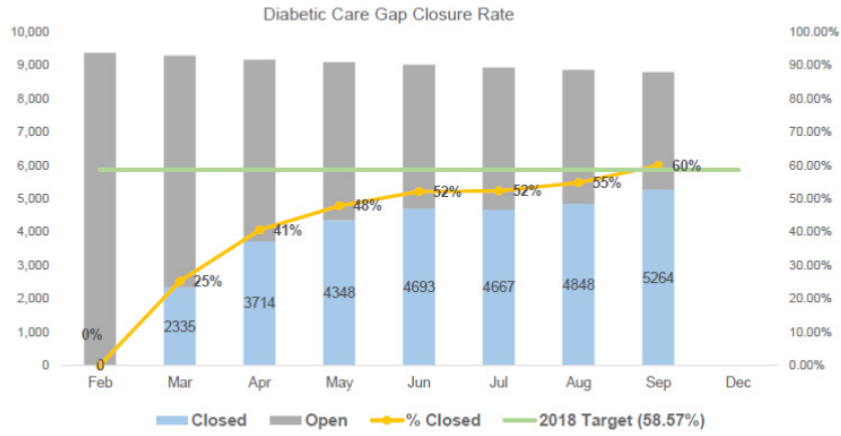

FIGURE 5-1 A program to close care gaps for patients with diabetes succeeded in getting vision tests, urinalyses, and hemoglobin A1C screening for 60 percent.
SOURCE: As presented by John Snyder at the workshop Integrating Oral and General Health Through Health Literacy Practices on December 6, 2018.

That information populates a provider's record, making it possible to determine who is engaging with the system and advancing integration. The system has also helped reimagine care teams by making it possible to collaborate and talk across divides so that providers share responsibility for a member's total health.

Also in 2016, the health care system opened its first dental and medical office that combined medical care with general dentistry and pediatric dentistry. In other cases, dental and medical care were co-located, but the combined office has a higher rate of addressing preventive gaps than at offices that are simply adjacent. Patients are 110 percent more likely to receive the child flu immunization, 81 percent more likely to receive the child human papillomavirus vaccination, 114 percent more likely to receive an adult physical, and 160 percent more likely to receive a cervical cancer screening. "That's part of the cultural transformation that changes when you get adjacency and interprofessional interactions," said Snyder, "amazing results."

The health care system is now testing three models of dental care that feature different combinations of people, processes, and infrastructure. For example, in the models with licensed practical nurses embedded in a dental setting, dental patients can quickly and easily have their blood drawn or receive an immunization (see Figure 5-2). "We're looking for the most affordable models, but also to gain the most efficiency and improve outcomes," Snyder said. As another example of improved integration, Snyder

		Model 1 Salmon Creek Co-located Medical & Dental Office	Model 2 Beaverton Co-located Medical & Dental Office	Model 3 Glisan Stand Alone Dental Office
People	Enhanced Care Coordination by Dental Team	✓		
	Embedded LPN		✓	✓
Process	Facilitated on-site care gap closure	✓		
	Completed on-site care gap closure		✓	✓
	Proactive fishing for care gap closure opportunities		✓	✓
	On-site referrals/coordination for chronic diseases	✓	✓	
	Off-site referrals for chronic diseases			✓
Infrastructure/Place	Health connect Optimization	✓	✓	✓
	Modified Med Prep Area			✓
	Coordination with Lab	✓	✓	

FIGURE 5-2 Three models of dental and primary care integration currently being evaluated by Permanente Dental Associates.
NOTE: LPN = licensed practical nurse.
SOURCE: As presented by John Snyder at the workshop Integrating Oral and General Health Through Health Literacy Practices on December 6, 2018.

mentioned the new ability to identify people over the age of 65 who did not receive an influenza vaccine the previous year. This information can go to a dental clinic in an effort to encourage vulnerable patients to get vaccinated. "If I prevent one of those people from not having inpatient services associated with an influenza respiratory infection," Snyder pointed out, "I paid for that whole day, every vaccine and then some." The system is even able to identify people in the waiting room who are not scheduled for a treatment and pull them into the clinic to fill care gaps.

With value-based compensation, financial returns depend on the individual performance of the overall dental office in terms of patient experiences and integrated care. Furthermore, with a global payment, oral health providers, as a professional group, have the best understanding of what they value and how the health of patients should be measured. Patients appreciate the convenience as much or more as they do better outcomes, saying things like, "I don't have to drive here again. I can get my flu shot, get all this done."

Measures of improved patient satisfaction and care also benefit oral health providers, who are paid more under their contracts for improving overall care. Furthermore, providing integrated medical and dental care has established a new standard for high-quality, convenient, and afford-

able health care. Providers take a shared responsibility for their patients' total health and wellness, and meeting the needs of members is easier because bridges have been built between departments. "All those things are fundamental and essential elements if you truly want to integrate care—and it's fun," Snyder concluded.

DELIVERING PREVENTIVE ORAL HEALTH SERVICES

Into the Mouths of Babes (IMB), which is one of the programs highlighted in the commissioned paper (see Chapter 2), had three goals when it began in the year 2000, observed Kelly Close, early childhood oral health coordinator for the Oral Health Section of the North Carolina Division of Public Health. The first was to increase access to preventive oral health services for low-income children ages 0 to 3. The second was to reduce the prevalence of early childhood caries. The third was to reduce the burden of treatment needs on an inadequate and stretched dental workforce in North Carolina. The state had already identified an early childhood caries crisis and had done a small pilot program in the western part of North Carolina from 1998 to 2000, which became IMB.

When the program went statewide, it had six partners: the North Carolina Academy of Family Physicians, North Carolina Medicaid, the North Carolina Oral Health Section, the North Carolina Pediatric Society, the University of North Carolina Gillings School of Global Public Health, and the University of North Carolina School of Dentistry. Each of these six organizations had an active role and was invested in the program, said Close. The medical organizations negotiated the reimbursement rates with Medicaid. The Oral Health Section and the School of Dentistry worked together to develop training for physicians. The School of Public Health worked to develop the evaluation for the program. The program, which was initially funded by grants, hired Close as a coordinator and paid her salary.

Close agreed with earlier presenters that primary care providers have limited time and resources in offering and providing oral health care to patients, and this barrier has increased over time in North Carolina. Furthermore, dentists could not take on this responsibility for young children, because many parents do not take their children to the dentist by age 1 or even by age 2 (though more do now than in the past, Close added). As a result, the members of the original partnership realized that they needed to offer preventive oral health services where children could be reached, which was in the offices of the family physicians, pediatricians, and local health departments where children were going to get immunizations.

Preventive oral health services include more than just fluoride varnish, Close remarked. These services include an oral evaluation, risk assessment,

varnish application, parent counseling, and a dental referral if the dental workforce is adequate. This referral should occur by age 1, she said. If that is not possible, a priority oral health risk assessment and referral tool is available to refer children based on their risk.

Research has shown that physicians, and particularly pediatricians, tend to view dentists as specialists. They are trained to treat whatever they can in their offices, and when they cannot treat something they make a referral. Therefore, when children have high-risk behaviors for caries, including diet, types of behaviors, and habits, they counsel parents about changing those risk behaviors rather than referring to a dentist based on the risk factors. "Of course they're great about referring if there's disease present," said Close. "But I do think there would need to be a mind shift in how they view dentists as a general provider and practitioner, as we have talked about earlier today. I know that dentists see themselves, at least general dentistry, as primary care. But I can't say that that's true across the board for medicine."

When North Carolina Medicaid reimburses for preventive oral health services, which is approximately $50 when the service is done, two codes are billed. The D0145 code is an oral evaluation for patients under age 3, though North Carolina reimburses for this evaluation up to age 3 and a half. The D1206 code is for fluoride varnish. A provider can do this procedure a maximum of six times for a child from tooth eruption to age 3 and a half with a minimum interval between procedures of 60 days, a time limit designed so as not to interfere with well-child visits, which can be spaced less than 90 days apart. Preventive oral health services can be provided at well-child visits, sick visits, or separately scheduled visits, and both medical and dental providers can be reimbursed for preventive services.

The number of annual visits under the program grew to approximately 170,000 in 2017. In 2016, 57.8 percent of the approximately 47,000 quarterly well-child visits for 1- and 2-year-olds included preventive oral health services. "We have room for improvement," Close said of these numbers. At the same time, other community programs support preventive oral health services. For example, in North Carolina communities with Early Head Start programs, parents report that about 80 percent of young children received preventive oral health services by a dentist or nondental medical provider by age 3, which is a higher rate than for children on Medicaid but not enrolled in Early Head Start in those communities (Burgette et al., 2018).

Close briefly described three studies of program outcomes, which are among about 50 evaluation and outcomes articles on IMB. Kranz and colleagues (2014) showed that setting and provider type do not influence the effectiveness of the preventive oral health services on children's overall oral health. Kranz and colleagues (2015) found that children making four or

more IMB visits before age 3 show a 17.7 percent reduction in tooth decay, compared with children making 0 visits. And Achembong and colleagues (2014) showed that the program has contributed to a statewide decline in decay rates since 2004 and has helped reduce the gap in tooth decay between children from low- and other-income families at the community level.

Close also called attention to the 2014 recommendation from the U.S. Preventive Services Task Force that oral fluoride supplementation start at age 6 months for children whose water supply is deficient and that fluoride varnish be applied to the primary teeth of all children starting at tooth eruption (Moyer, 2014). The task force has concluded as well that evidence is insufficient for recommending routine screening examinations for dental caries, but the same was said for fluoride varnish in 2004, Close pointed out. "You researchers," she said, "we need you to do some research on screening."

Research has shown that parents express satisfaction with having preventive oral health services at primary care visits (Rozier et al., 2005), experience low health literacy demands by medical providers during oral health counseling (Kranz et al., 2013), and are more likely to take their child for a dental visit when referred by a medical provider (Beil and Rozier, 2010). Parents play "a huge role" in their children's oral health, said Close, "and I feel that they're overlooked." Parents have many barriers to seeking preventive oral health services for their children, but common assumptions about what these barriers are may not be right. Close recommended the use of motivational interviewing as a patient-centered, evidence-based behavioral intervention (Borrelli et al., 2015). The use of the technique is associated with improvements in pediatric health behaviors and outcomes, and medical providers in North Carolina have opportunities to be trained in the technique. An e-learning training module for IMB scheduled for release a few months after this workshop features examples of parent counseling using this technique.[8]

Community integration remains critical, Close said, including not just medical and dental providers but public health programs, child care programs, and other settings. Everyone needs to be able to convey evidence-based messages using plain language. For example, fluoride toothpaste is, along with fluoride varnish, one of the top ways to prevent early childhood caries. The message that fluoride is still the most effective way to prevent tooth decay and that prevention is healthier and cheaper than treatment needs to be disseminated as widely and as clearly as possible, she said. Messages also need to be consistent. For example, the American Academy of

[8]See the "Parent Education" section of https://publichealth.nc.gov/oralhealth/partners/IMB-toolkit.htm (accessed June 10, 2019) for more information about the online training modules.

Pediatrics and the American Academy of Pediatric Dentistry have differing recommendations about fluoride varnish, with the latter recommending it for high-risk children and the former recommending it for all children. "That's conflicting," she said. The website toothtalk.org provides colorful, short, and informative videos, articles, and other evidence-based information for early childhood caregivers, parents, health care providers, and others.

Once a child has a cavity in a baby tooth, that child is much more likely to have cavities in permanent teeth, and fixing those is much more expensive than taking preventive measures. "There's a lot to be said for starting early with prevention and with children's parents," Close concluded.

EFFECTIVE REFERRALS

At the beginning of the discussion session, Fisher-Owens asked the panelists specifically about referral systems, noting that a referral can take many different forms, from writing on a piece of paper that a patient ought to see another provider to walking a patient to another office to be treated immediately. Close responded that she does not know what the most effective referral method is because IMB has not done research on that question. But "we do know that getting kids into the dentist early is important, even with medical providers doing preventive oral health services," because children with dental treatment needs do not receive this care from medical providers. A pilot program in North Carolina has taught dentists to be comfortable around young children, which can improve rates of preventive dental care. Another initiative has urged medical practices to make referrals, but still only about 50 percent of children make a dental visit.

Medical providers have demonstrated some reluctance to add an oral health risk assessment tool to their already full well-child visits, she acknowledged, which is "a dilemma." Doing a risk assessment in another venue is a possibility, though she is not sure where that venue would be. "I do know that, within a group of children, some are more at risk than others. And I think the evidence shows us that, for children at high risk, the early dental visit is important."

Acharya responded that the best way of making referrals is the way that is easiest for patients. In recent years he has been trying to understand more about how medical practices handle oral health and dentistry, and one thing he has found is that medical providers can hesitate to tell their patients to see a dentist because of access and insurance issues. Some patients even come back to their medical providers after a dental referral and say that dentists were not able to see them.

He thought that the best model for making sure a referral takes place is co-located medical and dental care. When a dental practice is in the same place as a medical practice, medical providers have more assurance that

their patients will see a dentist, and vice versa. Clinical referral managers can also help ensure that referrals take place, as can team care that provides both dental and general health services.

Joskow shared some best practices for referrals that have emerged from pilot projects and demonstration projects. One is scheduling a follow-up appointment before the patient leaves the medical appointment. "Even if it meant the receptionist or the front desk person contacted the dental clinic or the dental provider, that seemed to be much more successful in a completed dental visit." Warm handoffs in which care is transferred from one provider to another in front of a patient or a patient's family member have also proven to be successful. In addition, care gaps, including oral health care gaps, can show up on physicians' computer screens, so that two populations in particular, people with diabetes and children older than 1 year, are referred to dentists.

Patient navigators, case managers, and transportation facilitators can be aware of an individual's, family's, or community's barriers to care and can facilitate referrals, Joskow continued. An "ingenious" approach has been to give patients some sort of cards or other signifiers and promising them that they will receive something when they arrive for a referral. Snyder recalled a similar experience in which patients with a care gap were given a card and told that when they presented it in another office they would automatically go to the front of the line. Actually, the system did not work exactly this way, Snyder admitted. Rather, when a patient was given a card, the provider called the other office and said that the patient was on the way. "That was the way to get them connected." Snyder also observed that dentists are lucky to have hour-long visits with their patients, which makes it easier to forge connections. Hygienists are particularly good at this, he said. They can get to know a patient and urge the patient to get something done. "That personal touch really makes the difference," Snyder said.

Referrals also work in the opposite direction, from dental providers to general health providers, and dentists are good at making these referrals, according to Acharya, because they can be very analytical in terms of closing health care gaps. When the Marshfield Clinic Health System instituted an initiative to make sure that all of its patients were receiving blood pressure screening, dentists were among the leaders in referring their patients into primary care, helping to raise the screening rate from 72 percent to close to 89 percent. "It's a health *system*. It needs to be part and parcel of how we care for our patients."

BEHAVIORAL HEALTH

Fisher-Owens also asked about the role of behavioral health in integration, citing Asian Health Services, a program in Oakland, California, that

introduced a behavioral health team into dental visits to provide behavioral health services.

Joskow mentioned a webinar on integrating oral health and behavioral health in primary care that targeted social workers and other behavioral health providers. Feedback received from dentists after the webinar was that they wanted a webinar specifically on how to incorporate behavioral health into a dental environment. For one thing, such training could help dentists cope with "dental phobics," who can be very challenging for dental care providers, said Joskow.

INTERPROFESSIONAL EDUCATION

In response to a question about the best way to do interprofessional education, Close talked about the training done for IMB. It is certified for continuing medical education (CME) through the American Academy of Family Physicians with an American Medical Association equivalent. It is renewed every year, physicians get 1 hour of credit for attending the training, and Web-based training now in development will also have a CME component. However, she doubted that the credit is a major draw for those who take the training. She thought instead that providers are motivated to want to provide the services taught, especially because the services have come to be considered a standard of care in North Carolina.

Acharya noted that his organization works closely with primary care providers to make sure that a curriculum is made available to them. The course is not mandatory, and providers already have many training requirements, but the course is available and offers credit. Another training opportunity, he noted, is through grand rounds, where dental researchers or other dental providers have talked about medical–dental integration.

Integrating more content into medical training is a continuing challenge, he said, especially given the lack of time professionals have for such training. But he also predicted that greater patient literacy was going to produce a shift in the thinking of providers. As patients become more educated and ask their providers more questions, providers will need to be more responsive. An important question then becomes how to get patients the information they need given their preexisting levels of health literacy.

LANGUAGES OTHER THAN ENGLISH

In response to a question from Fisher-Owens about the provision of health literacy information in languages other than English, Joskow observed that the federal government tries to provide information in other languages whenever it can. "We try to leverage whatever resources are already available. But we are cognizant of that and trying to work to expand that."

At the same time, the need for languages other than English comes up in many different settings. Joskow described, for example, a recent health fair in which head and neck cancer screenings were involved. The health fair was done in a local mall with a very diverse population, and intake was done in five different languages. Referrals also had to be done in multiple languages, which was challenging.

On this point, Joskow described a colleague who begins some of her talks entirely in Spanish to demonstrate what it is like for people who do not speak English. "Her message is, 'Now you understand how uncomfortable it can be if English is not your first language.'"

QUESTIONS FROM WORKSHOP PARTICIPANTS

At the end of the discussion session, Fisher-Owens called for workshop participants to provide questions that could be addressed over the course of the day as well as by the panelists. The following questions were provided:

- Can the location of dental and medical practices cause legal problems due to differing regulatory regimes?
- How can oral health be brought into the community, including into unconventional settings such as barber shops and faith-based organizations?
- How can integration of oral and general health be coordinated with such programs as maternal and infant health programs and home visiting programs?
- How can behavioral change models be applied by providers to further integration?
- How can health literacy be used not only to inform integration but to drive it? For example, do patient portals offer a way for patients to understand the value of integrated systems and demand such systems?

6

Developing a Research Agenda for Integration[1]

The need to expand the evidence base to drive policy was a theme both of the commissioned paper and of earlier discussions in the workshop, said Jane Weintraub, moderator of the final panel at the workshop, alumna, distinguished professor, and former dean at the University of North Carolina School of Dentistry, and adjunct professor in the University of North Carolina Gillings School of Global Public Health. During the panel session, Weintraub posed to four experts a series of research-related questions on the relationship between oral health and general health: Hugh Silk, medical director of a wellness and primary care center in Massachusetts as part of Community Healthlink, and professor in the Department of Family Medicine and Community Health at the Harvard School of Dental Medicine; Cassandra Yarbrough, lead public policy analyst for the Health Policy Institute at the American Dental Association; Ira Lamster, dean emeritus of the College of Dental Medicine at Columbia University and clinical professor at the Stony Brook University School of Dental Medicine; and Wendy

[1] This chapter is based on presentations by Ira Lamster, dean emeritus of the College of Dental Medicine at Columbia University and clinical professor at the Stony Brook University School of Dental Medicine; Wendy Mouradian, associate dean and professor emerita of pediatric dentistry and strategic advisor for the Regional Initiatives in Dental Education program at the University of Washington; Hugh Silk, medical director of a wellness and primary care center in Massachusetts as part of Community Healthlink, and professor in the Department of Family Medicine and Community Health at the Harvard School of Dental Medicine; and Cassandra Yarbrough, lead public policy analyst for the Health Policy Institute at the American Dental Association. Their statements are not endorsed or verified by the National Academies of Sciences, Engineering, and Medicine.

Mouradian, associate dean and professor emerita of pediatric dentistry and strategic advisor for regional initiatives of dental education for the Regional Initiatives in Dental Education (RIDE) program at the University of Washington.

At times, the discussion extended into the broader issues surrounding integration. "Integration of oral health and primary care is a health literacy issue," said Weintraub. "It's also a quality of life issue, a health issue, and a health equity issue." As a professor of dentistry, she said that "it is very gratifying to me, personally, to have so many people inside and outside of the oral health professions listening and learning together today." The oral health community cannot achieve integration on its own, she observed. "We need to build a sense of belonging for oral health to be part of health and health care for patients, providers, and policy makers."

THE FORCES DRIVING EDUCATION

In responding to Weintraub's initial question about the most important areas of health literacy and integration for a research agenda, Silk turned first to issues involving education. The Center for Integration of Primary Care and Oral Health, a joint endeavor of several academic organizations supported by the Health Resources and Services Administration (HRSA) and based at the University of Massachusetts Medical School, has done surveys to determine what is happening across the country and not just in places where integration is happening.[2] Based on this research, Silk and colleagues reported that hours of oral health training in family medicine decreased from 2012 to 2017 (Silk et al., 2018). The researchers found that only one-third of residents receive more than 3 hours of oral health education (Silk et al., 2018). Only 50 percent of respondents felt their residents were ready to answer questions about oral health on their board exams. Only one-quarter of pediatric directors responded that they felt satisfied with their graduating residents' oral health competency. These are "devastating numbers," said Silk, "despite the fact that we've been at this for quite a long time now."

He noted that in 2006 the Accreditation Council for Graduate Medical Education established recommendations and accreditation standards for the inclusion of oral health in pediatric and family medicine programs. Then, in 2015, the council reversed these recommendations. Since then, the amount of oral health training in these programs has been declining. "We have to look at those kinds of standards" and their impact on training, he said.

[2] More information about the center is available at https://umassmed.edu/fmch/centers/center-for-integration-of-primary-care-and-oral-health2 (accessed June 10, 2019).

At the same time, training for the application of fluoride varnish is rapidly rising in family medicine and pediatrics. Silk attributed this increase to the U.S. Preventive Services Task Force recommendation on preventive oral health services and to the availability of reimbursement. "What is driving education," he said, is an important issue for integration.

His center has been looking at physician assistants, nurse practitioners, midwives, obstetricians, and other primary care providers. Glicken, in the *Journal of Physician Assistant Education*, reported that 96 percent of physician assistant programs are offering oral health instruction, and one-third are providing more than 10 hours of training (Glicken et al., in press). Among pediatric nurse practitioner programs, according to the *Journal of the American Association of Nurse Practitioners*, 100 percent are teaching oral health (Dolce et al., 2018).

Again, contributing factors are not hard to find. The DentaQuest Foundation has been supporting nurse practitioners and physician assistants over the past couple of years, and the National Interprofessional Initiative on Oral Health has focused on that issue as well. But other professional areas, he said, are not taking the subject seriously enough.

WHAT PATIENTS WANT

Yarbrough recounted a recent talk by Don Berwick, former administrator of the Centers for Medicare & Medicaid Services and current senior fellow at the Institute for Healthcare Improvement, in which he mentioned a clinic in Germany that has refocused its care on what matters most to patients being treated for prostate cancer. As a result, the clinic directed attention to improving erectile dysfunction rates and incontinence, "and you could see that their improvements in those areas skyrocketed compared to all the other clinics treating prostate cancer across Germany," said Yarbrough.

In this regard, dentistry is about 20 years behind medicine, she said. "We haven't started looking seriously at the outcome measures that patients care about when it comes to oral health." She recalled Dean Schillinger's presentation in which he discussed such measures of oral health as problems with dry mouth, embarrassment due to the condition of mouth and teeth, and the ability to interview for a job given the condition of mouth and teeth. "Issues like that impact your world beyond the clinical things that we think about in the dental office. That is one of the main areas that we should continue to focus on as we move forward."

She also read for workshop participants the definition of oral health from the FDI World Dental Federation (Glick et al., 2017): "Oral health is multifaceted and includes the ability to speak, smile, smell, taste, touch, chew, swallow, and convey a range of emotions through facial expressions

with confidence and without pain, discomfort, and disease of the craniofacial complex." Those are the things that matter to people, Yarbrough said. Emphasizing these objectives will get more people to access care, and they are critical issues for providers to consider. Doing so would lead to such conversations as, "I see you're losing a lot of weight. Is this because you have pain when you chew? Are you avoiding eating and keeping up with your nutrition? Here's how my treatment plan can help."

The new definition of oral health has influenced a working group at the International Consortium for Health Outcomes Measurement that is creating a new international oral health measure set. However, in terms of practitioners or providers using that definition, she has not seen much movement. Even the larger group practices do not have an incentive to use the definition because of the way dental benefits are reimbursed. That may be different for systems such as Kaiser Permanente, the Marshfield Clinic, or HealthPartners, but the disconnect between reimbursement and value still hinders systemwide change, she said.

Cost is one reason why people do not seek care, but "we need to push that agenda a little bit farther," said Yarbrough. Is it because they feel they cannot afford to come in if they need more than a dental exam and a cleaning? Are they health literate enough to know that their dental benefit does not cover such procedures? Are they weighing such costs against other necessities? The fundamental issue, again, is the separation of dental from medical care, she said. "If we really want to integrate these two, we're going to have to start buckling down on not separating dental in any capacity."

Finally, she mentioned the need to measure the return on investment of integrating oral health into whole-body health. A number of studies have shown the effects of dental care on lowering health care costs for diabetic patients and individuals with heart disease. These studies need to be expanded, she said, which is why the initiatives being undertaken by HealthPartners, Kaiser Permanente, Marshfield Clinic, and others are so exciting. "These are the pilots, if you will, for the dental industry, in terms of really proving why it's important to have that integration. I can't wait to see some of that research come out that looks at a broader population beyond those suffering from very important and very expensive chronic conditions," said Yarbrough. Such research could help encourage people to take their oral health seriously.

She also mentioned the momentum behind adding a dental benefit to Medicare. The Santa Fe Group, Oral Health America, AARP, and other advocacy, consumer, and policy groups are taking this very seriously. The current effort is mostly focused on diabetes, with a concerted effort under way to add dental benefits to Medicare for those individuals who have diabetes. This could eventually affect more than half of the Medicare population (Hasche et al., 2017; Ward et al., 2017), particularly if several

other chronic diseases are added to the mix. This advance then could act as a platform to roll out a dental benefit to the entire Medicare population.

In the U.S. health care system, Medicare sets the stage for the rest of the system, Yarbrough noted, so a dental benefit in Medicare could have much broader effects, including the creation of mandated dental benefits in Medicaid.

THE POTENTIAL FOR SAVINGS

Lamster began by noting that a growing body of literature exists, along with growing professional support, for the expansion of the scope of dental practice to include primary health care (Lamster and Myers-Wright, 2017). The population in developed countries is aging, he pointed out, with a concomitant increase in chronic diseases. At the same time, tooth retention is increasing, which means that dental providers will see an increasing number of older patients with complex medical histories who are used to good oral health care and will demand continued good oral health care.

This confluence of trends has created an opportunity to use the dental office as a source of health care. The United States has hundreds of thousands of oral health care providers, and the time that they allot to patients, especially in the preventive phase, is much greater than in medical care, Lamster said. "This is an opportunity that is not to be missed."

For the past 25 years, Lamster has been studying the relationship between oral health and diabetes mellitus. Though this is not the only relationship between oral health and a chronic disease, it is the one for which the volume and breadth of the data are greatest. Almost 10 percent of adults have diabetes mellitus, 25 percent of whom are undiagnosed.[3] Patients with diabetes mellitus develop a wide range of changes in the oral cavity and contiguous structures, including not just periodontal disease but reduction in salivary flow, burning mouth syndrome, and swelling of the parotids. In Lamster's studies, between 30 and 40 percent of patients were identified as dysglycemic, with 5 to 7 percent in the diabetes mellitus range and the remainder being in the prediabetes range. The latter is not a formal diagnosis but an identification of risk, said Lamster, and these previously unidentified patients should be referred to a medical provider. In a small pilot of about 100 patients to see how responsive they would be to that referral, Lamster reported, 70 percent reported 6 months later that they had seen a medical provider (Lalla et al., 2015).

Lamster also briefly described the body of literature demonstrating that people who have chronic disease and access to dental services have lower

[3] These and other statistics about diabetes are available at https://www.cdc.gov/diabetes/pdfs/data/statistics/national-diabetes-statistics-report.pdf (accessed April 23, 2019).

health costs and improved health outcomes compared with those who do not have access to dental services. These data, which come largely from private insurance companies, have potential confounders and may be the result of correlation rather than causation, but the analysis, which is ongoing, is suggestive.

Lamster also described an ongoing study of the Medicaid population in New York State, which is producing comparably promising results for patients with diabetes mellitus, cardiovascular disease, cognitive impairment, and respiratory disease. This study is suggesting that the health care dollars that are saved are actually greater among Medicaid patients than among patients who have private insurance.

ACHIEVING INTEGRATION THROUGH EDUCATION

Health literacy is "perhaps the best outcome metric that we could have as we move toward integrating the system," said Mouradian. As a general and developmental pediatrician for the first 15 years of her professional life, Mouradian's lack of knowledge of oral health was not challenged—even though her father was a dentist. But then she became involved with a craniofacial clinic, which she described as "the best model of integration that I believe exists today." There she learned how little she knew about oral health and began "a personal mission to understand the ethical and health consequences of this medical–dental divide."

As project co-director of the Surgeon General's 2000 Workshop and Conference on Children and Oral Health for the National Institute of Dental and Craniofacial Research (NIDCR), Mouradian found that work on integration was scarce. When she and her colleagues put out a call for papers for the conference, they received five abstracts on the integration of medicine and dentistry. Much progress has been made since then. The background paper commissioned by the roundtable (see Chapter 2) demonstrates "the richness of the efforts and sheer numbers of programs." More information needs to be gathered from these programs, and more standardization is needed, but the advances have been substantial, she said.

Returning from NIDCR to the University of Washington, Mouradian moved from the School of Medicine to the School of Dentistry. There she participated in many HRSA-funded projects to train medical students, medical residents, and faculty members in oral health. She found that most physicians in Washington and adjoining states did not know much about oral health and did not have it as a high priority, so she began to focus on the training of medical students. This training is "fundamental," she said, because health professionals control the services that are actually offered to patients and educate patients about what is important and what is not important. Furthermore, other examples demonstrate that medical and

dental education can change, such as the effort to integrate community-based education into dental education, which was jumpstarted by the Robert Wood Johnson Foundation and other foundations. Over a decade, community-based rotations went from being implemented in just a few schools to being required by the Commission on Dental Accreditation. "I saw a change in our school from where faculty didn't want students to go out and students didn't want to go out, to where they were thrilled to send students out and students wanted to go," she said. "I do believe the culture of education can change over time."

Mouradian recommended establishing a similar process of medical and dental integration involving about a dozen schools around the country, not just one or two. She also agreed with Lamster that integration is a two-way street. Though dental students and dental faculty tend to insist that not enough time is available to learn about medical care while also learning dental skills, "when we actually put people together and we give them those experiences, it changes them," said Mouradian. Such an initiative would also generate a large amount of useful data for research as dental students learn about primary care tasks that they can apply in their professions.

Finally, Mouradian observed that primary care providers need to involve dental providers more in general health care, and that dental providers need to be prepared to get involved. She continued:

> I want to tell my dental students that it's time for you to be doctors, real doctors. I know some of my dental colleagues might shrink as I say that, but it is a different culture. I live at that interface and I know that the training in dentistry has typically not allowed dental students to participate in whole-patient care and to take on that kind of responsibility. And that has an impact on the way they are willing to practice later.

She also urged moving oral health into Medicare and said that doing so could greatly enhance the education of patients, physicians, and other health professionals about oral health and dental care. If every Medicare patient could be informed at every medical visit about the opportunity to have dental care, the effects would be enormous. She said,

> We're not at the tipping point yet, but how far we've come in the last two decades is astounding. If we had another decade of concentrated efforts, including well-evaluated educational programs that picked up a dozen or more partnered dental and medical schools, nursing or physician-assisting schools, we could be at the tipping point.

THE EFFECTS OF ACCREDITATION ON EDUCATION

As part of the discussion of interprofessional education, Lamster asked whether such programs could become more than window dressing and something that students will embrace. "Unfortunately, since dental education is so challenging today—financially and in other ways—unless it goes into the accreditation standards, it probably will not happen," he said. Weintraub agreed about the importance of accreditation, noting that integration is just one of a number of competing priorities for accreditors but that accreditation is critical in driving changes in general education.

Mouradian pointed out that new accreditation requirements are not required for progress. For example, new accreditation requirements would not be needed for a group of medical and dental schools to work together on integration. However, such a collaboration could result in new accreditation standards, in the same way that community-based education standards have evolved. "I go back to the importance of large, well-measured, and well-studied education projects among the medical, dental, and other health professional schools."

With regard to the diversity of education programs, Mouradian noted that most dental and medical schools have outreach programs to bring in underrepresented minorities, and some of those programs put medical and dental students together. Such programs provide an opportunity to promote interprofessional care. "I've long wanted to take a cohort of students from the very beginning and mix them all up," she said. "We'd have a very different kind of student at the end. You could put a number of these important pipeline paradigms together, including underrepresented minority students, but also the opportunity to expose these students to a breadth of richness in integration."

OUTCOME MEASURES

A major issue in the work of his center on the impact of oral health training for primary care clinicians, said Silk in response to a question on the greatest gaps in research, has been the use of outcome measures. He mentioned several valuable studies that have been done, including the Qualis Health study on workflow, the HRSA project that Joskow mentioned, the Medical Oral Expanded Care (MORE Care) rural health, and the Perinatal and Infant Oral Health Quality Improvement grants. However, many studies continue to rely on process measures rather than outcome measures. One problem is that research grants typically last for only a few years. That can be contrasted with Into the Mouths of Babes, which because of its extended existence and research has been able to see caries rates going down. "But that takes 20 years to prove," Silk pointed out.

A major question is whether researchers will be content with process measures or will strive for more meaningful measures. He and his colleagues have been working on a tool that could be used in a clinical setting to make such measures. For example, because fluoride varnish reduces caries, increasing fluoride varnish rates would imply that the caries rate should go down, though "we still have to be careful with that inference." The tool they are developing could be applied in a federally qualified health center or a private practice to work from process measures to better outcome measures, Silk said.

A related problem is the difficulty that clinics have communicating with each other. In an ongoing project involving obstetricians and dentists, the only way for the two groups to communicate has been to fax pieces of paper between offices and count them at the end of the month. "We have no way to know if people are making it to the referral, let alone then going into the records and seeing what happened with it." An electronic health record that bridged that gap would be extremely valuable but does not yet exist except in closed systems, such as Kaiser Permanente and the Marshfield Clinic.

Yarbrough pointed out that even when health information systems are able to communicate with each other, outcome measures may not be meaningful or actionable. The Dental Quality Alliance has taken on the task of trying to create outcome measures that can propel the dental industry toward value-based payments and evidence-based care. But even those measures are systems measures: How many children went in for an exam? How many sealants were placed?

At the time of the workshop, the International Consortium for Health Outcomes Measurement was working on an oral health outcomes measurement guide. Yarbrough described the guide as including a good combination of systems measures with which clinicians are comfortable and outcome measures that patients care about.

One problem is getting dentists to implement such measures, Yarbrough added. Especially with dentists who work in private practice and do not necessarily communicate with others, either in medical practices or other dental practices, no obvious incentive exists for them to use outcome measures in their practice. "That's something I'd like to see us think about more in the research community," Yarbrough said. "How can we get folks to implement those?" This is an area where Medicare and Medicaid could play an important role, she added.

COMPARING COSTS AND BENEFITS

The introduction of dental benefits into Medicare raises three questions, noted Lamster. The first is how expensive it will be, which relates to

how sustainable it will be. The second is whether it will improve health care outcomes. The third—and the most important, in Lamster's estimation—is whether it will save money, "because that's what seems to be driving the decision-making process." Without saving money, he said, "it just won't happen."

Mouradian responded by recalling Schillinger's presentation (see Chapter 4) about the magnitude of the costs of not providing dental care, not only in terms of oral health but in terms of mental health, employability, and so on. In addition, the separation of medicine and dentistry has created an enormous duplication of infrastructure between medical and dental education, which has not only been expensive but has slowed the progress of research on oral health. The dental explorer and X-ray technology are more than 100 years old, she pointed out, yet until recently these were the primary technologies used in dentistry. She recommended producing a background paper like the one generated for the workshop on the unintended consequences and larger costs of failing to integrate oral health with general health, because considerable data and research are available on the subject. Such a background paper should also look at the ethical, legal, and social dimensions of integration, just as those were studied for the human genome project, she said.

Mouradian also pointed out that the consequences of failing to integrate are even deeper and broader than most people appreciate, beyond disparities, public health benefits, and costs to the system. For example, one consequence of the isolation of dentistry is that it is not prepared to participate in some of the major changes going on in medicine, such as advances in genomics, proteomics, and precision health care. Medicine is undergoing "a revolution," she said. Health care decisions for providers and patients are going to become much more complex. Dentistry risks being marginalized by not participating in these areas. This observation also extends to complementary and alternative medicine, she said. When she went to her University of California, San Francisco–trained family practitioner, she was told that she needed to get rid of fluoride products and possibly take the amalgams out of her teeth. "Dentistry needs to be there, because there is a science that needs to be brought to bear, and because some questionable practices are being promulgated."

New research is pointing to possible links between oral health pathogens and the amyloid plaques of patients with Alzheimer's disease. "Where are we? Are we out there with those researchers? Are we participating?" she asked.

She also discussed a missing ethical dimension resulting from the dental–medical divide. Among the generally accepted principles of ethics are beneficence, nonmalevolence, and informed decision making. A lack of oral health literacy runs counter to every one of those principles, she observed.

She posed the question, for example, of whether patients could bring legal challenges to the dental or medical system because of not being informed about the importance of oral health care in managing their diabetes.

Weintraub observed that the commissioned paper found that interprofessional education results in increased knowledge, but that research has not focused on interprofessional collaborative practice and patient outcomes, especially outcomes not related just to oral health.

THE POWER OF ANECDOTES

Yarbrough called attention to an issue that goes beyond the cost argument that better oral health would save money: what she called the "storytelling" aspect of policy. Shortly before the workshop, the state of Maryland added an adult Medicaid dental benefit to their program. Policy insiders said that the studies of integration were important factors. "But what actually drove the legislators to make the change was that we had one Democrat and one Republican and both of them were impacted by oral health on a personal level," including one who had a brother who ended up in the hospital from an oral infection. "Those personal stories are what sometimes actually influence policy makers to pay attention to us."

Silk agreed, noting that many people know the name Deamonte Driver and the story of how he died when bacteria from an abscessed tooth spread to his brain. Furthermore, such events among the population in general are not rare. Shah and colleagues (2013), in a study of 61,439 hospitalizations over 9 years in the United States that were primarily attributed to periapical abscesses, found that 66 of the patients died in the hospital. "We don't know the names of one of those adults," he said. "If we knew those 66 names, and we knew those stories, then maybe that would have an impact." He also noted that, in meetings with medical students and state legislators in Massachusetts, the legislators have said that if they receive even five letters, e-mails, or texts about an issue, that is enough for them to start thinking about legislation, "because if five people take the time to write something, that's a big deal." As Weintraub pointed out, "A lot of policy makers have never had a dental problem. We need to get them to go to a Mission of Mercy clinic and see all the people standing on line with dental problems."

Silk also observed that he worked in a setting with people who have significant mental health disease and addictions. Most of his patients do not have teeth, which affects their self-worth and makes the rest of their life a nutritional challenge. These patients need more than oral health literacy. They need access to care, including access to dentures so they can eat. "We have to get policy makers to understand this," he said. "If you had those stories of people with Medicare and how disastrous their lives become,

that would certainly move us toward the Medicare benefit, and not just for diabetic patients."

URBAN AND RURAL ENVIRONMENTS

In response to a question about the provision of oral health services in urban versus rural settings, Silk noted that challenges can arise in both regions. Populations in either setting may not have enough providers. Teledentistry can be a valuable application both with rural populations and other populations, such as in the prison system. The MORE Care project, he observed, is focused on workflow issues in rural settings so that primary care teams are not overwhelmed.[4] Qualis Health is another organization working on these issues.[5]

Mouradian mentioned the RIDE program, which includes a component that sends dental students into rural areas. These students can be alone in a dental office and not have access to a physician, she noted, which is one reason to provide them with training on systemic health issues. "They get a lot of training in CPR and interprofessional experiences because of the fact that they are isolated." In addition, because of their isolated circumstances, rural areas open up opportunities for collaboration. "Some of our best partnerships are with more rural communities."

Yarbrough referenced some of the organizations that look at shortage areas, including HRSA and the Health Policy Institute. "There's an opportunity for us, in the near future, to come together and try to come to a more consistent definition of a shortage area," she said. That will also require a better measure of access, which is also a concern of the Medicaid program.

DISRUPTIVE TECHNOLOGIES

A question about disruptive technologies led the panelists to consider the possibility that technologies in dentistry, such as changes affecting transportation or getting resources to people in need, could change the field. Silk described the straightforward technology of texting high-risk children and parents about brushing their teeth, about diet, and about other aspects of oral health. He also described a more advanced technology where electric toothbrushes could record how long they were on and the pressure

[4] More information about the MORE Care project is available at https://www.dentaquestinstitute.org/learn/quality-improvement-initiatives/medical_oral_expanded_care (accessed June 10, 2019).

[5] More information on Qualis Health is available at http://www.qualishealth.org (accessed June 10, 2019).

being applied to the teeth. Such technologies could especially be useful in research, he pointed out.

Yarbrough mentioned an application of smartphones where patients take a photograph of their mouth and send it to a dentist for a risk assessment and recommended treatment. It is an application of teledentistry, she pointed out, that could specifically target low-income individuals who do not have access to services in a dental office. "It's trying to bridge that gap and meet the patient where they are." More broadly, teledentistry could further integration, coordination, and communication across professions.

Lamster noted that some of the best work on teledentistry is coming out of Australia, where distances make the availability of dental specialists (i.e., an oral pathologist) very challenging in some remote areas. Other applications in Australia have focused on long-term care, the distribution of resources to children, and specialty care.

Weintraub mentioned the potentially disruptive technology of silver diamine fluoride, "which is not really a new technique but is new in the U.S. because of recent FDA [U.S. Food and Drug Administration] approval." Applied to an open dental cavity, silver diamine fluoride causes the decay to harden and arrest so that it does not progress.

Information technology could also be a disruptive force in the integration of oral and general health care. The value of health literacy driving integration is that it simplifies the patient experience and helps them navigate the system of care, said Linda Harris, director of the Division of Health Communication and e-Health Team in the Office of Disease Prevention and Health Promotion at the U.S. Department of Health and Human Services. Vehicles like the patient portal could help patients understand their experiences with health care systems and the value of those experiences. A pilot project could look at such opportunities from a patient's perspective and ask whether a simplified system of care that combines dental and primary care provides them with more satisfaction and confidence. "The real value is going to lie with the patient," she said.

With regard to the patient portal, Weintraub noted that many dental practitioners still are not using electronic health records. However, the system is moving in that direction, "so a pilot project would be great."

TRANSITIONING THROUGH AN INFLECTION

Lamster observed that dentistry is at an inflection point. He doubted that the fee-for-service system will exist in any significant way in 30 years. Corporate dentistry will continue to offer opportunities for the introduction of new concepts—"sometimes for the right reasons, sometimes for the wrong." He noted that, in a review of state laws that govern dental practice in all 50 states, about half of the states had a broad definition of what

dental practice is and the other half had a narrow definition, which clearly demonstrates that opportunities for change exist in some places.

Yarbrough noted that some of the best opportunities to try new and innovative ideas occur in publicly funded programs such as Medicare or Medicaid and in such entities as accountable care organizations. However, "after we do the innovative project, the pilot project, how do we convince folks that all of these great outcomes from that pilot or from that innovation are worth it and should be spread across the system as a whole? That's the big piece that we haven't answered yet." Society continues to treat oral health as a commodity that can be interchanged with other goods rather than as an integral aspect of health. "If I had a cut in my arm, I'd go to the hospital and nobody would question whether or not I needed that fixed. But if I have a toothache, I go to the hospital and they give me a pain prescription and an antibiotic and then I go on my way."

Mouradian responded that if patients, physicians, and other members of society fully understood the consequences of not having oral health, they would feel very differently about it. She suggested further exploring the possible consequences of physicians missing oral health diagnoses, because "physicians are very fear driven, we're very afraid of missing something important."

In response to a question about value-based care, Yarbrough observed that a preventive health care system requires team-based primary care, including a dentist or some other sort of oral health provider. Echoing Mouradian, she called for a large pilot project that would measure the return on investment of such care, in part to determine the value of integrating dental care into primary care.

> I'd love to see a day where we don't have to keep separating the two when we talk about it. Because, as somebody said earlier, most general practitioner dentists and pediatric dentists see themselves as primary care providers. We also need physicians to acknowledge them in that way, and the best way to do that is to have them work as a team rather than separately.

Finally, Silk called for better coordination among the public health, private health care, and government agency sectors. Many government agencies and nonprofit organizations are involved in integration, but "everyone is doing their own thing," he said. Past policy reports have pointed to the need for oral health leaders. Such leaders—including some of the people at the workshop, he noted—could provide that vital coordination.

7

Reflections on the Workshop

In the final session of the workshop, the members of the roundtable identified key themes that they had heard over the course of the day and reflected on these themes and on the implications of integrating oral health care and general health care.

THE PROSPECTS FOR AND BARRIERS TO INTEGRATION

Catina O'Leary, president and chief executive officer of Health Literacy Media, started the discussion by commending the authors of the commissioned paper (see Chapter 2) and the systems approach to thinking about integration. A challenge, she added, is to create systems in which people who have different kinds and levels of training can work together for the benefit of the patient. That requires asking patients what matters to them and what is important, which is where health literacy is important.

Johanna Martinez, graduate medical education director of diversity and health equity at Northwell Health, praised Yarbrough's definition of oral health (see Chapter 6): "Oral health is multifaceted and includes the ability to speak, smile, smell, taste, touch, chew, swallow, and convey a range of emotions through facial expressions with confidence and without pain, discomfort, and disease of the craniofacial complex." The definition emphasizes that oral health, like health in general, is multifaceted, and that maintaining health likewise requires a multifaceted approach.

Vanessa Simonds, assistant professor of community health at Montana State University, observed that the importance of dental health to overall health makes a powerful case for integration. Both economic analyses and

personal stories of how oral health affects eating, speaking, or getting a job can help make this point. She also noted that one effective way to reach a community and to be a change agent is to work with children, which is another place where developing health literacy can be critical.

Steven Rush, director of health literacy innovations at UnitedHealth Group, emphasized the business case for oral health literacy and the integration of oral health and general health. He recounted an experience at UnitedHealth Group in which a group of professionals considered how the system handles back pain, with the result that benefits were changed so that people could go to spine specialists first with little or no copay or co-insurance. "Focus on the business case," he recommended. "Figure out how to present that to decision leaders in the states and in the health care industry."

Nicole Holland, assistant professor and director of health communication, education, and promotion at the Tufts University School of Dental Medicine, rephrased the idea of dental and general health care being *responsible* for integration to their being *accountable* for integration. "It's not just responsibility," she said. "It's more the accountability of all the providers in going back to why are we in this. Because we do know the majority of dental diseases are preventable, but the disease burden is still so high. When we think about whose responsibility it is, we need to think about that critically."

Lindsey Robinson, California Dental Association, noted that the dental profession has an ambivalent relationship with medicine. The majority of dentists are still running small businesses, and it is very difficult to be part of large governmental programs like Medicare or Medicaid when running a small business. "That's where integration will help overcome those barriers and perhaps make some dentists more willing and able to participate," she said. In addition, for dentists to be able to provide an expanded level of care, states need to be more open to expanding scopes of practice so that existing practitioners are able to do the functions they were trained to do.

Lawrence Smith, dean of the Donald and Barbara Zucker School of Medicine at Hofstra/Northwell and executive vice president and physician-in-chief of Northwell Health, noted that the incompatibility of medical records between the dental and general health systems means that it will not be possible to use big data to answer questions that have not been answered before. For instance, the general health system is now merging genetic analyses with disease processes, responses to medication, side effects, and familial patterns to determine the interactions of genetics with systemic health. If both oral health and behavioral health are left out of this process, prevalent and prominent correlations will not be found. "If we don't solve this problem in both situations, behavioral health and oral health, we're

going to leave big gaps in the ability to understand phenotypic-genotypic correlations."

Suzanne Bakken, alumna professor of nursing and professor of biomedical informatics at Columbia University, also said she was interested in how the Marshfield Clinic was integrating medical and dental records to the extent of being able to do data mining on the combined data. On this issue, Gayle Mathe, director of community health policy and programs at the California Dental Association, stated that medical records are commercial products for the most part for which integration is not a high priority. Getting the Health Resources and Services Administration (HRSA) or some other organization to fund work on an integrated record that would be widely disseminated would "make a huge difference."

Terri Ann Parnell, principal and founder of Health Literacy Partners, appreciated the structure of the meeting in returning to the themes of health literacy and integration. She commented that issues such as additional health professional education, the consistency of definitions, practicing to the full scope of practice, breaking down silos, innovative technology, telemedicine, and looking at measures of health all relate to those two central themes.

PROFESSIONAL BURNOUT AS A FACTOR IN INTEGRATION

Smith pointed out that the medical profession has never had a higher burnout rate in history than it does today. "We may well lose a generation of practitioners, and the highest burnout rate is in primary care physicians." He worried it was unrealistic that primary care physicians would be able to assume some of the tasks described at the workshop. Primary care must be delivered by a team, he said, and everyone on the team must be able to do the maximum that they are allowed to do by virtue of their education. Primary care physicians therefore should be responsible for tasks that require the complexity of training they received in medical school and residency. "I'd like to know a little bit more about teeth when I look in the mouth—that would be a positive thing. But the idea of doing structured oral health screenings is not going to be part of that physician's job. It just can't be."

Christopher Trudeau, associate professor of medical humanities at the University of Arkansas for Medical Sciences and associate professor of law at the William H. Bowen School of Law at the University of Arkansas at Little Rock, agreed that the comments about primary care physicians being overburdened resonated with him. "How do we create a coordinated care model that works in all areas?" For example, the idea that anyone with training can apply fluoride varnish was a revelation. Embracing more of that kind of innovation can help reduce disparities in a more integrated system.

Integrated and health-literate practices will help achieve what is coming to be known as the quadruple aim, said Bernard Rosof, chief executive officer of the Quality in Health Care Advisory Group, and professor of medicine in the Donald and Barbara Zucker School of Medicine at Hofstra/Northwell:

- Enhancing the patient experience
- Improving population health
- Reducing costs
- Improving the work life of health care providers, including clinicians and staff

The integration of oral and general health through greater health literacy can help achieve these aims while focusing on the concept of value in terms of cost effectiveness versus outcomes, Rosof said.

THE NEED TO ADDRESS SOCIAL DETERMINANTS

Michael McKee, assistant professor of family medicine at the University of Michigan Medical School, expressed surprise at how many ways oral health affects people. As such, oral health disparities raise the basic issue of people's right to health care. As with general health, oral health has many haves and have-nots. This is the case not only for vulnerable populations but for other populations, such as those in health systems of different sizes. If integration occurs only in large government programs and health care corporations, many people will be missed. All of these observations argue for a global health insurance system, he said, that encompasses both dental and medical care. Keeping the two separate is "onerous, inefficient, and unfortunate for many people in our country."

Jennifer Dillaha, medical director for immunizations and medical advisor for health literacy and communication at the Arkansas Department of Health, emphasized the importance of the social determinants of health. She noted that addressing these in a health-literate way can do much to promote the integration of health. Martinez, too, mentioned the need to address social determinants, "because if not, it's all for nothing."

Robinson emphasized the need to reach out to populations that are not served by large health care organizations and provide them with care in community-based settings "where the kids are, where the families are." This idea appealed as well to Terry Davis, professor of medicine and pediatrics at Louisiana State University Health Sciences Center, who praised the idea of bringing oral health care to where children are and having this care delivered by a wide variety of professionals.

THE ROLE OF HEALTH LITERACY

Linda Harris, director of the Division of Health Communication and e-Health Team in the Office of Disease Prevention and Health Promotion at the U.S. Department of Health and Human Services, emphasized the value of the workshop in clarifying how the entire health care system can become more navigable through enhanced health literacy. She thought that a Medicare pilot project or demonstration project could help vulnerable people use the health care system in a way that leaves them more informed, "which is essential for having a value-based care system."

Amanda Wilson, head of the National Network Coordinating Office at the National Library of Medicine, pointed to the critical role that health literacy can play in dealing with the "tsunami" of change posed by integration. However, the task of using literacy to advance integration is daunting, she added. The complexity of both dental care and medical care is not worked to the benefit of the patient. In that respect, team-based care is probably the most promising way forward.

Wilson also pointed to the need for dentistry and not just primary care to change. An integrated system with a global budget and vertical integration can help drive these changes.

Lori Hall, director of health literacy, Global Medical Strategy and Operations, for Eli Lilly and Company, talked about meeting patients where they are. "The missing piece for the evolution of this discussion is to talk with patients." She also recommended leveraging what is known about the role that health literacy plays in general health and about the factors that influence nonadherence in patients to better understand why patients do not adhere to a healthy dental health regime. Finally, she recommended involving representatives from the target audiences in research and in the planning, implementation, dissemination, and evaluation of information regarding their oral health.

Mathe reemphasized the point about engaging across the social services, where oral health literacy practices are fundamental to success, especially given the relatively small influence of clinical services on most people's health. Following the money is a useful guide. "When the medical payers see the benefit and feel the benefit, the needle will start to move. And because it hasn't moved as much as it could, that's where I'd be focusing research." For example, if a demonstration project in Medicare could focus on people with diabetes and prove how much money is being saved, the demonstrated return on investment could drive change.

HEALTH LITERACY AND COMMUNICATION

Holland emphasized the influence of the language used within health care. For example, within dentistry, and within her specialty of facial pain,

"the terminology is all over the place." People do not know what TMJ (temporomandibular joint) or TMD (temporomandibular joint disorder) means. Doing research on some of the basic questions involved in communication information "would certainly lift both oral health and general health."

Davis, too, noted that, like medicine, dental health is full of jargon. People spoke repeatedly at the workshop about caries and periodontal disease, but most people think of these as cavities and gum disease. Many people continue to have low levels of health literacy, she pointed out, which requires that communications be understandable, not just that those levels of literacy be raised. "Sometimes I feel like I need help with forms in the dental office," she said.

Gemirald Daus, public health analyst with HRSA's Office of Health Equity, agreed that being able to speak clearly with each other would help integration. Even the phrase "oral health" is not exactly plain language, Daus noted. The definition of oral health discussed at the workshop could help with this.

Dillaha pointed out that health care providers struggle with communications between and within primary care centers. Health literacy can be a lever to put pressure on the system to integrate physical, behavioral, and oral health.

Olayinka Shiyanbola, assistant professor in the Division of Social and Administrative Sciences at the University of Wisconsin–Madison School of Pharmacy, mentioned a family member who ended up in the hospital because of a dental issue and emphasized the opportunity to communicate health information when a patient is in a dental chair. It would be an opportunity for a patient to learn about periodontal disease or even the proper way to floss. "Even if it's just that little piece where we start enhancing health literacy and bringing forth health literacy principles, it would go a long way."

EDUCATION AS A DRIVER OF INTEGRATION

With regard to education, McKee emphasized the pipeline issue and the need for dentistry to attract a very diverse range of students and faculty members. In particular, more needs to be done for people who want to return to their communities, he said. Martinez also called attention to the importance of the educational pipeline in building human capacity, doing research, and changing systems.

Bakken mentioned the simulation training across professional students taking place at Columbia as part of an effort to promote integration. She also noted that Columbia has a nurse who is jointly appointed in the School of Dentistry, which makes interprofessional education easier.

HAVING AN OPPORTUNITY TO EXPLORE INTEGRATION

Holland thanked the roundtable and the National Academies for holding the workshop, saying that her students at the Tufts University School of Dental Medicine were "excited that oral health has been elevated to this level." Robinson similarly expressed her thankfulness to the National Academies and to the roundtable for organizing and holding a workshop on the subject of oral health. She also thanked the past director of the roundtable, Lyla Hernandez, who retired the summer before the workshop but was instrumental in moving it forward.

Finally, Robinson mentioned again the power of stories, such as the story of Deamonte Driver's death, to move policy. "His death was a reflection of a system's failure," she said. It helped create champions who can remove barriers, "whatever they may be: economic, policy, educational, health literacy, or oral health literacy."

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Appendix A

Workshop Agenda

THURSDAY, DECEMBER 6, 2018

8:30–8:45 AM **WELCOME AND WORKSHOP OVERVIEW**
Bernard Rosof, Chair, Roundtable on Health Literacy

8:45–10:15 AM **SESSION 1: A SYSTEMS APPROACH TO INTEGRATING ORAL HEALTH AND GENERAL HEALTH**

Objectives:
- Gain a better understanding of the benefits of integration
- Explore the ways in which systems encourage or discourage integration
- Gain a better understanding of the ways in which health literacy is a catalyst for integration

8:45–9:30 AM **Presentation: Commissioned paper**
Kathryn Atchison, University of California, Los Angeles (UCLA), Fielding School of Dentistry

9:30–10:15 AM	**Panel discussion: Systems thinking, integration, and health literacy as a catalyst** Moderator: Dushanka Kleinman, University of Maryland School of Public Health *Kathryn Atchison, UCLA Fielding School of Dentistry* *Anita Glicken, National Interprofessional Initiative on Oral Health* *Ronald Inge, Delta Dental Missouri* *George Taylor, University of California, San Francisco (UCSF), School of Dentistry*
10:15–10:30 AM	BREAK
10:30 AM–12:15 PM	**SESSION 2: HEALTH LITERACY AND CARE INTEGRATION** Objective: Explore in detail the ways in which integration and health literacy can • improve health and well-being • lead to more patient centered care
10:30–10:40 AM	**Moderator introductions** Moderator: Alice Horowitz, University of Maryland School of Public Health
10:40–11:00 AM	**Health literacy, oral health, and general health** Dean Schillinger, UCSF
11:00–11:20 AM	**Integration from the patient perspective** Brian Hill, Oral Cancer Foundation
11:20–11:40 AM	**How oral health literacy shapes policy making** Meg Booth, Children's Dental Health Project
11:40 AM–12:15 PM	**Discussion**
12:15–1:15 PM	BREAK
1:15–3:20 PM	**SESSION 3: PATHWAYS TO INTEGRATION** Objective: • Explore the different ways of achieving integration and the role of health literacy

1:15–1:25 PM	**Moderator introductions** Moderator: Susan Fisher-Owens, UCSF
1:25–1:45 PM	**Oral health strategic framework** Renée W. Joskow, U.S. Public Health Service and Health Resources and Services Administration
1:45–2:05 PM	**Driving the medical and dental care integration through combined electronic health records** Amit Acharya, Marshfield Clinic Research Institute and Family Health Center of Marshfield
2:05–2:25 PM	**Integrating oral health and primary care at Kaiser Permanente** John Snyder, Permanente Dental Associates
2:25–2:45 PM	**Into the Mouths of Babes: Delivering preventive oral health services** Kelly Close, Into the Mouths of Babes
2:45–3:20 PM	**Moderated panel discussion**
3:20–3:30 PM	BREAK
3:30–5:00 PM	**SESSION 4: DEVELOPING A RESEARCH AGENDA FOR INTEGRATING ORAL AND GENERAL HEALTH** Objectives: • Explore the current gaps in research • Discuss what would be necessary to fill those gaps, including data and resources • Identify the touchpoints where health literacy can move things forward
3:30–4:30 PM	**Moderated panel discussion** Moderator: Jane Weintraub, University of North Carolina School of Dentistry *Ira Lamster, Stony Brook University School of Dental Medicine* *Wendy Mouradian, University of Washington School of Dentistry*

Hugh Silk, Center for Integration of Primary Care and Oral Health, Harvard University
Cassandra Yarbrough, American Dental Association, Health Policy Institute

4:30–5:00 PM **Discussion**

5:00–5:30 PM **Reflections on the day**

5:30 PM ADJOURN

Appendix B

Biographical Sketches

Amit Acharya, Ph.D., M.S., B.D.S., currently serves as the executive director of the Marshfield Clinic Research Institute (MCRI) at Marshfield Clinic Health System (MCHS) in Wisconsin. He subsequently serves as the chief dental informatics officer of the Family Health Center (FHC) at MCHS. FHC is a federally qualified health center and affiliate partner of MCHS.

Dr. Acharya has been a leading researcher and is well regarded throughout the United States on his expertise in biomedical and dental informatics. As a general dental surgeon and a computer scientist with expertise in biomedical informatics, his research focus has been around integration of medical and dental data, clinical and research information systems, architecture of electronic health records, clinical decision supports, and investigating the oral-systemic disease relationships.

Dr. Acharya has been instrumental in founding the Center for Oral and Systemic Health, one of the six research centers at the MCRI, and in the integration of MCHS's electronic dental records with its proprietary electronic medical records. Dr. Acharya has published more than 100 scientific abstracts and manuscripts in peer-reviewed journals and has received multiple grants dedicated to bridging the medical and dental divide. He has also edited a book, *Integration of Medical and Dental Care and Patient Data*, which is published by Springer Nature.

Dr. Acharya has held several national leadership roles at the American Dental Education Association and at the American Medical Informatics Association's Dental Informatics Group. He also served as the chairman of the clinical informatics subcommittee of the American Dental Association's (ADA's) Standards Committee for Dental Informatics and was the ADA

representative to the Health Level Seven in 2017. He has served on national health information technology expert panels coordinated by entities like the Agency for Healthcare Research and Quality, the Office of the National Coordinator for Health Information Technology, and the National Quality Forum. Dr. Acharya currently serves as a member on the advisory board of the National Center for Community Health Research and on the ADA Dental Quality Alliance's Implementation and Evaluation Committee.

Kathryn A. Atchison, D.D.S., M.P.H., holds a professor appointment in the University of California, Los Angeles (UCLA), School of Dentistry's Division of Public Health and Community Dentistry and is jointly appointed in the UCLA Fielding School of Public Health, Department of Health Policy Management. Dr. Atchison served UCLA as the vice provost for new collaborative initiatives from 2011 to 2016 and as vice provost for intellectual property and industry relations from 2005 to 2011. From 1998 to 2004 she served as the School of Dentistry's associate dean for research and knowledge management. She was the School of Dentistry's residency director for geriatric dentistry from 2000 to 2006. Dr. Atchison was the recipient of the International Association for Dental Research's 2008 Distinguished Scientist Award for Behavioral Sciences, Epidemiology and Health Services Research. During 2014–2015, Dr. Atchison was on special assignment to the Office of the Director of the National Institute of Dental and Craniofacial Research (NIDCR) in the National Institutes of Health, where she helped develop strategies aimed at strengthening NIDCR's ability to translate research discoveries into new tools and treatment. She is a fellow of the American Association for Dental Research. Dr. Atchison was invited to prepare a commissioned paper for the National Academies' Roundtable on Health Literacy in 2016 titled "Integrating Oral Health, Primary Care, and Health Literacy: Considerations for Health Professional Practice, Education and Policy."

Meg Booth, M.P.H., is the director of the Children's Dental Health Project (CDHP), a nonprofit organization that focuses on removing oral health barriers to family success based in Washington, DC. Over more than a decade at CDHP, she has built the organization's policy strategy to secure pediatric dental benefits in the Children's Health Insurance Program (CHIP) and the Patient Protection and Affordable Care Act. She has also led two federally funded national centers and currently serves as a state coach for the Centers for Medicare & Medicaid Services Innovator Accelerator Program on children's oral health to advance value-based purchasing in Medicaid and CHIP. Prior to CDHP, Ms. Booth worked to educate policy makers on child health issues at the local, state, and national levels. She holds a bachelor's degree in community health education with a minor in women's studies

from the University of Northern Iowa, and obtained her master's in public health at the University of North Carolina at Chapel Hill.

Kelly Close, M.H.A., is a career public health dental hygienist and is currently the early childhood oral health coordinator for the North Carolina Division of Public Health, Oral Health Section, including the Into the Mouths of Babes Physician Fluoride Varnish Program. Her education includes a bachelor of science degree in dental hygiene and a master of healthcare administration, both from the University of North Carolina at Chapel Hill.

Ms. Close chairs the North Carolina Early Childhood Oral Health Collaborative, is a contributor to scientific publications, and is a national presenter on the integration of infant and toddler preventive oral health services into primary care. Trained as a child care health consultant and a community dental health coordinator, she currently leads the partnership to develop toothbrushing protocols for North Carolina child care programs.

Susan Fisher-Owens, M.D., M.P.H., is a clinical professor of pediatrics in the University of California, San Francisco (UCSF), School of Medicine, and associate clinical professor of preventive and restorative dental sciences in the UCSF School of Dentistry. She serves as an executive committee member on the American Academy of Pediatrics Committee on Oral Health, and also serves with the California State Oral Health Plan and on the California Perinatal and Infant Oral Health Quality Advisory Board. She practices at Zuckerberg San Francisco General Hospital and Trauma Center, the county public hospital, and created an award-winning and sustainable oral health clinic embedded in their pediatric outpatient clinic. Dr. Fisher-Owens works with physicians on how to prevent oral disease in children, or control it in adults (particularly pregnant women), and with dentists on how to work with children and incorporate context of care. Her research on a conceptual model of children's oral health is cited internationally, and her current research focuses on children's oral health disparities.

Anita Duhl Glicken, M.S.W., is associate dean and professor emerita at the University of Colorado School of Medicine with more than 30 years of administrative, research, and education experience. She is currently executive director of the National Interprofessional Initiative on Oral Health (NIIOH), providing backbone support to a national movement to integrate oral health into primary care. Ms. Glicken has held several national leadership roles including president of the Physician Assistant Education Association and president/chief executive officer of the National Commission on Certification of Physician Assistants Health Foundation, where she led efforts to create a comprehensive database on certified physician assistant

practice, which informs national health policy and workforce planning. She has served on several Health Resources and Services Administration advisory workgroups to develop tools and resources that support national workforce research, education, and policy, including core oral health competencies for nondental providers. Her career in the United States and abroad has focused on creating innovative education and care delivery models grounded in interprofessional collaboration and health equity, most recently as the project director of an American International Health Alliance contract to build midlevel health workforce capacity in South Africa. She has been an invited member of the U.S. delegation to the International Health Workforce Collaborative since 2012. Ms. Glicken has authored more than 100 publications in health care education, workforce, and research.

Brian Hill is the founder and executive director of the Oral Cancer Foundation, and is a frequent public speaker on oral cancer issues at universities; at professional medical, dental, and research conferences; and on television news and magazine shows. He is routinely interviewed for oral cancer articles by numerous print media publications as diverse as *The Wall Street Journal*, *USA Today*, and the *Boston Globe*, as well as *Men's Health* and *Woman's Day* magazines, and is a trusted source for background material used to prepare major newscasters, writers, and talk show hosts.

Alice Horowitz, Ph.D., is a research associate professor at the University of Maryland School of Public Health. A health educator, Dr. Horowitz formerly was a senior scientist at the National Institute of Dental and Craniofacial Health (NIDCR), National Institutes of Health (NIH). Dr. Horowitz has done extensive work in dental caries prevention and early detection. While at the NIDCR she organized the Consensus Development Conference on Pit and Fissure Sealants, and co-organized the Dental Caries Diagnosis and Management conference.

Dr. Horowitz was instrumental in initiating the need to address health literacy in dentistry and was one of the authors of the first NIH Program Announcement addressing health literacy. She organized the NIDCR's workshop on oral health literacy and coauthored the resultant findings. Currently she is a co-chair of the Education/Health Literacy Subcommittee of the Maryland Dental Action Coalition. The group was commissioned by Maryland's Secretary of Health and Mental Hygiene, John Colmers, following the tragic and untimely death of Deamonte Driver, a 12-year-old boy who died in 2007 because of an untreated dental infection. Dr. Horowitz serves as the principal investigator on a statewide oral health literacy needs assessment study.

Dr. Horowitz served on the National Academies' Committee on an Oral Health Initiative. She has contributed several invited presentations to

the National Academies' Roundtable on Health Literacy. She has published more than 130 scientific papers and book chapters, and is the recipient of several awards. Dr. Horowitz conceptualized, designed, and conducted the study "Health Literacy Environmental Scans of Community-based Dental Clinics in Maryland," which was published in the *American Journal of Public Health*.

Ronald Inge, D.D.S., is currently the chief operations officer, chief dental officer, and vice president of professional services for Delta Dental Plan of Missouri. In this capacity, his responsibilities include all aspects of development and management of the dental and vision operations department, including claims and customer service. Dr. Inge is also responsible for the growth and development of the dental and vision networks, including clinical policies and procedures, quality management, and utilization review management.

Dr. Inge is an experienced senior-level dental benefits executive with exposure to all aspects of the dental industry and is acknowledged as an innovative thought leader in the dental benefits industry. As chief dental officer, he led the initial data analysis at Aetna that launched medical/dental integration. Dr. Inge served as the associate director for the Division of Dental Practice at the American Dental Association. Dr. Inge has served as the vice president of professional services and chief dental officer for Delta Dental of Washington. As the past executive director of the Institute for Oral Health, Dr. Inge has championed efforts to publicize innovative solutions to many of the current challenges to improving oral health. The mission of the Institute for Oral Health is to advance oral health care by identifying effective and efficient guidelines for treatment, access, and delivery of health care, and to promote best practices by serving as a central resource for shared practical knowledge and collaboration to benefit the dental profession and the public.

Renée W. Joskow, D.D.S., M.P.H., FAGD, is a dentist and a medical epidemiologist and holds both a doctor of dental surgery degree and a master of public health degree from Columbia University. She completed a hospital-based general practice residency at Hackensack University Medical Center in New Jersey, after which she was appointed to the faculty of Columbia University. During her tenure, Dr. Joskow maintained a private practice in New York and provided quality assurance/quality control consulting services for several health care entities in the New York-New Jersey-Connecticut tri-state area.

After 15 years in New York, Dr. Joskow joined the National Institutes of Dental and Craniofacial Research as a dental public health fellow. She later joined the National Center for Environmental Health, Centers for

Disease Control and Prevention as an epidemic intelligence service officer and applied her epidemiology skills and expertise in scientific research and outbreak investigations, including during the response to the 9/11 attacks, the anthrax investigations, and the 2002 Olympics. She has also served the Office of the Surgeon General, U.S. Department of Health and Human Services, as medical readiness manager and director of training and education for the U.S. Public Health Service (USPHS); the Chem/Bio Division, Science and Technology Directorate, in the Department of Homeland Security as senior medical epidemiologist and program manager; and the National Institutes of Health as a dental research officer and program official.

Dr. Joskow now serves as the senior dental advisor for the Health Resources and Services Administration (HRSA), where she provides leadership across HRSA on issues and activities related to oral health. She is board certified in the specialty of dental public health, and a fellow in the American College of Dentists, the Academy of General Dentistry, and the New York Academy of Dentists. She proudly holds the rank of captain (O-6) in the USPHS.

Dushanka V. Kleinman, D.D.S., M.Sc.D., is the principal associate dean, associate dean for research and professor, School of Public Health, University of Maryland, College Park. In this role she works closely with the school's and university's faculty, students and senior leadership, and has played a key role in the initial and subsequent accreditation of this new School of Public Health. Her research interests include prevention of oral health disparities, health literacy, and strategies to integrate oral and general health. Her recent research activities have included public health impact studies. Prior to this position, Dr. Kleinman completed 28 years of government service where she served as deputy director, National Institute of Dental and Craniofacial Research, National Institutes of Health, and assistant surgeon general (rear admiral), U.S. Public Health Service Commissioned Corps. Dr. Kleinman is a diplomate of the American Board of Dental Public Health and has served as president of the American Board of Dental Public Health, the American Association of Women Dentists, and the American Association of Public Health Dentistry. Currently she is the cochair of the U.S. Department of Health and Human Services Secretary's Advisory Committee on National Health Promotion and Disease Prevention Objectives for 2030. Dr. Kleinman has a D.D.S. from the University of Illinois at Chicago College of Dentistry and a hospital rotating internship at the University of Chicago Hospitals and Clinics. She received an M.Sc.D. in dental public health from the Henry M. Goldman School of Dental Medicine at Boston University.

Ira B. Lamster, D.D.S., M.M.Sc., is currently dean emeritus and professor of dental medicine at Columbia, and clinical professor at the Stony Brook University School of Dental Medicine. He received his D.D.S. from the State University of New York at Stony Brook (1977), his M.M.Sc. from Harvard University (1980), and a certificate of special training in periodontology from the Harvard School of Dental Medicine (1980). Dr. Lamster served as dean of the Columbia University College of Dental Medicine from 2001 to 2012, and as senior vice president of the Columbia University Medical Center from 2006 to 2012. From 2012 until 2017, he was in the Department of Health Policy and Management of the Columbia University Mailman School of Public Health.

Dr. Lamster's research efforts have focused on diagnostic testing and risk assessment for periodontal disease, the interrelationship of periodontal disease and systemic disease, the oral health care needs of older adults, and the future of dental education and practice. His research has been supported by the National Institutes of Health, corporations, and foundations.

Dr. Lamster is the author of more than 200 manuscripts and book chapters and has delivered more than 200 guest and invited lectures. He is the editor of *Improving Oral Health for the Elderly*, published by Springer in February 2008; both the January 2011 and October 2012 issues of the *Dental Clinics of North America* (addressing "Contemporary Concepts in the Diagnosis of Oral Dental Disease" and "Primary Health Care Activities in the Dental Office," respectively). He is also the editor of *Diabetes Mellitus and Oral Health: An Interprofessional Approach* published by Wiley/Blackwell in 2014, and of the October 2016 issue of *Periodontology 2000* (*Geriatric Periodontology*). He currently serves as editor-in-chief of the *International Dental Journal*.

Wendy Mouradian, M.D., M.S., is professor emerita of pediatric dentistry and a strategic advisor for Regional Initiatives in Dental Education (RIDE) Program expansion. She was the founding director of the RIDE Program and the immediate past associate dean of regional and academic affairs. In the past, Dr. Mouradian has served as special advisor on oral health to the Health Resources and Services Administration on the integration of oral health into primary care, and was project co-director of the Surgeon General's Workshop and Conference on Children's Oral Health for the National Institute of Dental and Craniofacial Research at the National Institutes of Health. Her research areas have included oral health workforce issues, ethics, and policy issues in the provision of oral health care to children, quality of life for children with craniofacial conditions, and interprofessional collaboration. Dr. Mouradian is also appointed in the University of Washington School of Medicine and School of Public Health.

Dean Schillinger, M.D., is professor of medicine in residence at the University of California, San Francisco (UCSF), and chief of the UCSF Division of General Internal Medicine at San Francisco General Hospital (SFGH). He is a practicing primary care physician at SFGH, an urban public hospital, where he sees patients, teaches in the primary care residency program, and conducts research. Dr. Schillinger served as chief of the Diabetes Prevention and Control Program for the California Department of Public Health from 2008 to 2013. Dr. Schillinger carries out research related to health care for vulnerable populations, and is an internationally recognized expert in health communication science. His work focuses on literacy, health communication, and chronic disease prevention and management. He has been honored with the 2003 Institute for Healthcare Advancement Research Award, the 2008 Research Award in Safety and Quality from the National Patient Safety Foundation, the 2009 Engel Award in Health Communication Research, and the 2010 Outstanding Bay Area Clinical Research Mentor. He also authored a paper on the attributes of health-literate health care organizations, commissioned by the National Academies' Roundtable on Health Literacy in 2012.

Dr. Schillinger is the founding director of the UCSF Center for Vulnerable Populations (CVP), whose mission is to carry out innovative research to prevent and treat chronic disease in populations for whom social conditions often conspire to both promote chronic disease and make its management more challenging. Dr. Schillinger currently directs the CVP Health Communications Program. He is the co-founder of TheBiggerPicture.org, a social marketing diabetes prevention campaign to empower minority youth to change the conversation about diabetes and become agents of positive social change. In 2013, he received the Everett M. Rogers Award from the American Public Health Association in recognition of his lifelong contributions to advancing the study and practice of public health communication.

Hugh Silk, M.D., M.P.H., received his B.A. from Harvard University, where he majored in government. He completed medical school at McMaster Medical School in Hamilton, Ontario, Canada. Dr. Silk undertook his residency at the University of Massachusetts Medical School Family Medicine Residency Program in Worcester and successfully completed a master of public health degree from the Harvard School of Public Health in Boston. Prior to medical school he taught with Dr. Robert Coles at Harvard University (*The Literature of Social Reflection*) and ran a youth service program in Toronto called Serve Canada.

Currently, Dr. Silk is the medical director of a Wellness and Primary Care Center in Leominster as a part of Community Healthlink, providing creative and meaningful care to patients with mental health issues. He is a professor in the Department of Family Medicine and Community Health,

and also teaches at the Harvard School of Dental Medicine and does public health work in oral health access and training health care providers to address oral health as part of overall health. He is the recipient of the 2016 American Association of Public Health Dentistry Public Service Award. He is currently working on a 5-year Health Resources and Services Administration grant to evaluate and implement oral health in medical and dental schools and primary care residency programs across the country. Dr. Silk's other interest in medical education is medical humanities and reflective writing.

John J. Snyder, D.M.D., is the executive dental director and chief executive officer at Permanente Dental Associates (PDA). Dr. Snyder completed his dental education at Oregon Health & Science University School of Dentistry in 1986. After completing a general practice residency at Hartford Hospital in Connecticut, Dr. Snyder returned to Oregon and joined PDA in 1987. Since that time he has served PDA in multiple leadership roles, and in 2008 he was elected by PDA shareholders to serve as the dental director and chief executive officer for PDA. He is currently serving in his second term.

He has remained a strong advocate for evidence-based dental practice, oral health research, and medical–dental integration throughout his career, and has enjoyed numerous national and international speaking opportunities to share his passion for expanding total health and wellness.

George W. Taylor, D.M.D., Dr.P.H., M.P.H., is associate dean for diversity and inclusion and a professor in the Department of Preventive and Restorative Dental Sciences in the Division of Oral Epidemiology and Dental Public Health at the University of California, San Francisco, School of Dentistry. He is a board-certified specialist in dental public health. He served as a dentist in the U.S. Air Force for 4 years and has had a career in academic dentistry for more than 35 years, teaching, conducting research, and providing patient care. He has taught, practiced general dentistry and dental public health, and conducted research.

In his role as associate dean for diversity and inclusion he works to strengthen the School of Dentistry as a diverse and inclusive climate that empowers students, faculty, and staff to maximize their capacity in learning, working, serving, and growing together.

Dr. Taylor's principal research focus is on relationships between oral and systemic health, particularly periodontal infection and diabetes outcomes. Additionally, he actively mentors students, residents, and other faculty in their research and careers.

Jane Weintraub, D.D.S., is alumna distinguished professor and former dean at the University of North Carolina (UNC) School of Dentistry and adjunct professor in the UNC Gillings School of Global Public Health. She is a dip-

lomate of the American Board of Dental Public Health and past president of the American Association of Public Health Dentistry. Widely known for her expertise in oral epidemiology, dental public health, and clinical research, she is a leader in research to understand and prevent oral health disparities. She is one of the coauthors of the commissioned paper for this workshop regarding the integration of oral health and primary care.

She received her D.D.S. at Stony Brook University and her M.P.H. and public health training at Harvard University. From 2001 to 2011, she was the founding director and principal investigator of the National Institutes of Health–funded Center to Address Disparities in Oral Health, nicknamed the CAN DO Center, at the University of California, San Francisco, School of Dentistry. After its first 7-year funding cycle, the CAN DO Center received an additional 7 years of funding, totaling $24.4 million.

Her awards include the International Association for Dental Research H. Trendley Dean Distinguished Scientist Award for her research in oral epidemiology and dental public health, the American Dental Association's Norton Ross Award for Excellence in Clinical Research, the American Association of Public Health Dentistry's Distinguished Service Award, and recently, the American Public Health Association Oral Health Section's John Knutson Award for Distinguished Service. Her current research cuts across the life span with a focus on prevention and relationships among oral health, health care, and systemic disease.

Cassandra Yarbrough, M.P.P., is the lead public policy analyst for the Health Policy Institute at the American Dental Association. She is responsible for researching and analyzing policy changes that impact dentistry, oral health, and the overall health care landscape. Ms. Yarbrough focuses on Medicaid, Medicare, dental access, and patient-centered outcomes. She obtained her M.P.P. from the University of Chicago and a bachelor's degree in sociology from the University of Illinois at Urbana-Champaign.