

GUEST EDITORIAL

Doing the Right Thing In the Face of Scientific Uncertainty

Effective Prevention of Oral Diseases

In contrast to medicine, dentistry places a major focus on just three diseases—dental caries, periodontal disease, and oral cancer. Most of these oral diseases are in large part preventable through the control of established risk factors, patient education, instruction in proper nutrition, and compliance with oral hygiene; and public health interventions such as water fluoridation. As with other population-based approaches, water fluoridation is a cost-effective way to deliver the benefits of fluoride to all residents of a community where the infrastructure is available to deliver its benefits. Dental prophylaxis can effectively remove local risk factors like plaque and calculus that contribute to the development of gingivitis and periodontal disease. Oral cancer has been traditionally related to tobacco use and/or excessive alcohol consumption. Dentists can counsel patients and prescribe medication for smoking cessation. Furthermore, unlike most forms of malignancy, certain lesions in the oral cavity can be readily detected because the mouth is easily accessible to clinical examination. In varying degrees, there has thus been significant progress in reducing the



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prevalence of oral diseases over time and across populations.

How might dentistry make further progress in extending preventive benefits to underserved populations, especially in cases of scientific uncertainty? To address that question, Ms. Michele Equinda, a senior dental student at the New York University College of Dentistry, and her faculty mentors focus on dental education and scientific uncertainty, and use the link between human papillomavirus (HPV) and oropharyngeal cancer as a case in point in this issue of the *Journal of the Academy of Distinguished Educators (JADE)*.

HPV is related to the majority of oropharyngeal cancers in the United States, outpacing the numbers of cases related to the traditional risk factors of tobacco use and/or excessive alcohol consumption. The currently recommended screening process for oral cancer is examination of the oral cavity. However, detection of HPV-related oropharyngeal

cancer is complicated by the hard-to-access location of these lesions. Note that screening for the virus per se is not recommended, since even if patients contract an oncogenic strain of HPV, most will eliminate the virus without any need for additional clinical intervention.

A promising approach is vaccination against HPV, but until recently advice regarding immunizations has not been a part of dental practice. Questions abound. Should dental

clinicians counsel their patients about the prevention of HPV infection? Should dentists recommend the HPV vaccine to their adolescent and young-adult patients? Note that the Centers for Disease Control and Prevention (CDC) recommends HPV vaccination for both male and female

adolescents and young adults to prevent genital lesions (warts) and anogenital and cervical cancers. Nonetheless, there remains scientific uncertainty about whether HPV vaccination will protect patients from oropharyngeal

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cancer, given the absence of scientific data from randomized clinical trials. The development of guidelines based upon the best available scientific evidence is thus urgently needed.

Curricular Reform to Address Scientific Uncertainty

A proposal for a revised curriculum at New York University College of Dentistry for each of the first three years (D1 through D3) that uses education about HPV infection as a working template is presented in this issue. This

revised curriculum shows where critical thinking and scientific reasoning can be developed and successfully built into certain

courses; e.g., Epidemiology and Critical Thinking; Health Promotion; Systemic Pathology;

Ethics; Communication in Health Care; and Online Education and Assessment. Students may then “bridge the gaps” and develop new guidelines in the face of scientific uncertainty. These guidelines may include the clinical management of HPV infection in the dental

setting, a protocol for counseling and referral, and potentially, recommendations to dental patients for HPV vaccination. An ethical framework for mandated HPV vaccination may include, for example, justice or the equitable distribution of an affordable vaccine; autonomy versus beneficence (the individual versus the public good); and nonmaleficence, or assurance that the vaccine is safe.

During my training in dental school at Case Western Reserve University (1970s), curricular reform generally did not include critical-thinking

skills, evidence-based reasoning, study of the scientific and clinical literature, and risk-factor assessment for infectious diseases.

This was perhaps not so unusual for most dental schools at that time. Instead, the emphasis was almost

exclusively on the acquisition of a traditional skill set to restore and replace missing teeth; the emphasis now is on prevention of caries and periodontal disease and the preservation of natural teeth. Thirty years ago, dental clinicians were in a quandary about how best to

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manage patients with what is now recognized as HIV/AIDS. The sobering reality is that dentistry can no longer afford to remain isolated as a profession.

Extensive international travel has changed the scope of dental and medical practice dramatically and irreversibly. As events of the past year have sharpened into focus, Ebola virus infection has engendered a humanitarian crisis in West Africa, and a fear campaign in West-

ern societies. Newman and Raffensperger proposed one framework for understanding emerging diseases such as Ebola virus, avian flu, SARS, and HIV/AIDS; namely, to think of them as the product of new connections—the interaction between previously separated species and concomitant transfer of pathogens into new hosts. Pathogens, their mutations, and people all frequently travel together across the globe. The Ebola virus skillfully made its way from bats to humans in West Africa, and then in a few isolated cases to Europe and the

United States. How should the practice of dentistry react to these newly emerging infectious diseases? What guidelines need development

when dental clinicians are again faced with scientific uncertainty? The education of future dental practitioners will require critical thinking and scientific reasoning, as dentists will need to interact with a much broader range of healthcare experts in medicine; e.g., infectious disease specialists, nurse prac-

tioners, healthcare policymakers, scientists, and ethicists to develop treatment guidelines. This is the new normal.

Addressing Future Needs

At present, dentists are the gatekeepers in the detection and treatment of oral diseases and the advancement of oral public health. In the future, dentists will likely “scope up” to include a wider range of healthcare activities in their practices. These activities will almost certainly include primary care screening for

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hypertension and diabetes, assessment of tobacco use and support for cessation, and a role in screening for and counseling around infectious diseases such as HIV/AIDS and HPV, including referrals to primary care providers for follow-up and treatment, if needed. At the same time, dentists will almost certainly “scope down” by delegating parts of their traditional skill set to allied dental healthcare professionals to perform needed services, such as dental prophylaxis, application of fluoride varnish and sealants, and the placement of uncomplicated restorations.

In this issue of *JADE*, Dr. Janice Lee argues that the future of dentistry and its specialties will rely on the science and research behind conditions that require

treatment and an understanding about how to maintain health. Dental schools train future practitioners in evidence-based dentistry. Whether a practitioner is a general dentist, specialist, or formally trained clinician-scientist, the translation of scientific data into clinical treatment will require a dual-focused

“Whether a practitioner is a general dentist, specialist, or formally trained clinician-scientist, the translation of scientific data into clinical treatment will require a dual-focused practitioner with clinical and scientific research skills.”

practitioner with clinical and scientific research skills. This will be the traditional skill set of future dental practitioners as gatekeepers in the detection and treatment of oral diseases and the advancement of oral public health. In that regard, Dr. Lee also discusses the launch of the National Institute of Dental and Craniofacial Research (NIDCR) Practice-Based Research Network (PBRN) in the United States, a program that has increased the number of participating dental practition-

ers who are trained to conduct research, as well as the number of dentists who are being trained to apply research in their clinical practices.

Also in this issue, Dr. Arthur Caplan points out that education and equipment are

needed to prevent Ebola infection from getting a foothold in poor nations. For that matter, even in a highly developed country like the United States, not every hospital is adequately equipped to manage patients with Ebola infection. Physicians from the United States who travel to West Africa to treat Ebola patients

deserve immediate treatment and the best available medical resources if they, too, become ill. While physicians take on the role of helping the very ill, it is not ethically defensible that they should lose their lives in treating others. Because of the greater risk of contracting a lethal infection, physicians are still expected to use personal protective equipment to provide care. Quarantining those infected with Ebola is not an effective strategy, as was also evident during the Severe Acute Respiratory Syndrome (SARS) epidemic. Thus, the need for effective therapies such as vaccines cannot be overemphasized, and if therapies show promise, then these should be implemented even before randomized controlled trials (RCTs) are finalized. U.S. federal funding is desperately needed for education, research, and development of therapies against newly emerging infections.

In a recent *Time* magazine issue devoted exclusively to the science of epidemics, William Karesh, executive vice president for health and policy at Ecohealth, remarked, “There’s a lot of potential risk in saying the wrong thing. And then, of course, there’s a potential risk of not doing the right thing.” The emphasis ought to be on doing the right thing, even in the face of scientific uncertainty.

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