INVITED REVIEW

Envisioning success: the future of the oral health care delivery system in the United States

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Abstract

The elimination of oral health disparities in the US will require enhancing access to oral health care services. The workshop convened in 2009 by the Institute of Medicine on the "US Oral Health Workforce in the Coming Decade" highlighted both the current workforce's failure to meet the nation's needs as well as the promising opportunities presented by various workforce strategies to significantly enhance access and improve oral health outcomes. In this article, we have briefly reviewed and expanded on the contributions in this special issue of the *Journal of Public Health Dentistry*, with the goal of identifying common themes and providing a framework for evaluation. There are several key areas where change is critically needed in order to ensure successful implementation of any new workforce models. These areas include a) the public and private financing of dental care, b) the dental educational system, and c) state and federal policies.

Introduction

The Institute of Medicine workshop in 2009 on the "US Oral Health Workforce in the Coming Decade" (1) highlighted trends in the current US dental workforce and the related problems of access to care. Evidence was presented illustrating how inequities in oral health outcomes in the United States resulted from the inability of the current workforce to meet the oral health needs of diverse populations. A number of alternative workforce models were discussed, some designed to meet specific unmet needs in targeted populations, while other models were focused more on how to improve efficiencies in care delivery and how to better integrate dental care within overall health care services. Several of the proposed workforce models were novel and untried, while other models have decades-long track records of success in other countries but had not been widely implemented in the United States (2).

The challenge for dentistry is to determine if innovative workforce solutions can be developed that will decrease disparities in access and improve the health of the nation as a whole. In addition, successful implementation of workforce innovations must include: reducing resistance to change by organized dentistry, adapting current and creating new educational and training programs, reforming policy governing dental practice, and creating a financing system that will enable the success of these changes. As a first step, a broadly accepted definition of success is required, as this can then lead

The authors are all members of the Santa Fe Group, a nonprofit organization, committed to serving as a catalyst for innovations in health care.

to consensus on how workforce innovations should be developed, evaluated, and compared. In this article, we create an evaluation framework to help define the metrics and create the consensus needed to move toward improving the dental care delivery system. Specifically, we discuss evaluation in terms of change in three domains: a) the public and private financing of dental care; b) the dental educational system, including current and new provider types as well as public health professionals; and c) legislation and policy changes needed to enable new workforce approaches.

Envisioning the future and evaluating change

The difficulty in accessing appropriate, affordable, and culturally sensitive care for many people in the United States has been well documented in the articles contributing to this issue (3-6). Implicit in the descriptions of inadequate access is the need to develop and deploy new approaches to care delivery, including new workforce configurations. The new workforce models are aimed at improving access and health outcomes for populations presently experiencing poor access to care delivered through private practices. Yet, new workforce approaches have met with resistance by those invested in the current delivery system. This resistance is often framed in terms of concern regarding the quality, effectiveness, and safety of new types of providers or changes in scope of practice for existing providers. Evidence is lacking for several of the novel workforce models now under consideration, although evidence of effectiveness and safety has been shown through a wide variety of dental provider demonstration projects in past research. Previous evaluation research in the 1960s and 1970s showed that in defined roles, both dental assistants and hygienists were able to provide clinical services that were comparable in quality to those provided by dentists (7). In the 1990s, evaluation of independent dental hygiene practice likewise showed safety, quality, and consumer satisfaction (8). Similarly, evidence of the quality and safety of care provided by dental therapists has been well documented (9). Nevertheless, efforts to change scopes of practice for existing providers and the addition of new types of providers to the US dental workforce continue to be controversial.

When considering workforce innovations, both new and existing models of care need to be evaluated and compared with regard to their cost-effectiveness and ability to produce desired oral health outcomes. To facilitate evaluation of the dental workforce, evaluation metrics should be adopted and agreed upon by all stakeholders. For evaluation of improvements in access and health status that result from the introduction of a new or modified provider type into a population, recommended metrics should include, at a minimum, documentation of: safety (no unwanted outcomes), lower disease incidence, lower prevalence of untreated disease, increased utilization of preventive services, decreased utilization of emergency services, enhanced access to needed services, and improved patient satisfaction and oral health-related quality of life. Ideally, the application of innovative workforce approaches should lead to a reduction in oral health disparities in access and health status when compared to the baseline (healthiest) groups in the nation.

"Follow the money" – Principles underlying need for payment reforms

Overall, it is estimated that about 170 million Americans have some form of dental insurance coverage today. However, about 43 percent of the population lack dental insurance – about 3 times as many as lack medical insurance (10). There is also a maldistribution of dentists, with few practicing in areas that are economically disadvantaged (3,4). However, even in areas with a robust economy, the participation of dentists in public assistance programs, such as Medicaid, is typically quite low (3). While we may have a system that provides dental care for those who can afford it, it fails to provide basic preventive and primary oral health services for nearly one-third of Americans (11).

Edelstein (3), Hilton and Lester (4), and Tomar and Cohen (12) highlight the importance of reimbursement to address disparities in oral health status, while Wendling (13) Glassman and Subar (5), and Skillman *et al*. (6) identified reimbursement policy as one component of system improvements to improve access to oral health care for certain populations. Without a doubt, private practicing dentists will continue to be the largest providers of oral health care services in the United States for the foreseeable future. Consequently, as Wendling (13) effectively argues, reform of dental care financing will need to ensure that the private practice infrastructure is integrated into any new care delivery approach. Without buy-in from private practicing dentists, which will be based in large part on assurances of the continued economic viability of the current private practice model, any new financing or workforce proposal will face challenges. Meeting the current access needs of the US population will require successful leveraging and coordination of new care models with the large supply of dental services presently delivered by the private practice dental care system. Therefore, to support workforce innovations aimed at addressing current gaps in access, dental financing reform must include incentives appropriate to all care delivery venues that reward appropriate, cost-effective, and preventive focused care, and allow for the continued viability of the private practice system.

As it is now structured, the fee-for-service model rewards dentists for the provision of costly reparative services while deemphasizing interventions aimed at prevention and disease management. Consequently, the current dental care

delivery system remains dominated by a "surgical" or "reparative" model for the delivery of care, rather than a prevention-oriented "health" model. As a result, the education of dentists and their ultimate practice patterns understandably focus more on the complex skills needed to restore the aftermath ("downstream" results) of oral disease rather than manage the underlying risk factors ("upstream" causes) of oral disease. This may be the most appropriate role for dentists, as tertiary care providers, in an integrated care delivery system. Paradoxically, as Wendling (13) notes, the majority (70 percent) of services billed in private dental offices are for diagnostic and preventive services. This is likely attributable to the lower disease rates now found in the patient populations that access private dental offices. It may also be due to the fact that routine diagnostic and preventive visits are traditionally done, and reimbursed, for most patients on a semiannual basis. The bulk of these preventive services are delivered by hygienists who typically act as the managers of primary prevention in many dental offices, with the dentist functioning as the provider of surgical and reparative services for selected patients. This is a sensible and cost-effective division of labor. What needs to be clarified with better evidence of cost-effectiveness is how best to manage the diagnostic and preventive needs of low-risk patients. In other words, are scarce dental resources being directed to the lowest risk patients, that is, patients with negligible risk of developing disease, when, as Glassman and Subar (5), Skillman *et al.* (6), and Edelstein (3) document in this issue, there are large numbers of high-risk patients who would likely benefit from these same interventions but are unable to access primary prevention services via private offices?

The call for increased accountability and cost control now occurring through the US health care system is not readily addressable by dentistry. Dentistry lacks nationally recognized standards for care and nationally accepted metrics for quality (14). In addition, there has been no broad-based implementation of detailed diagnostic codes for dental services similar to what has been implemented in medical care. Future reimbursement models must address the documentation of diagnosis of the oral disease/condition through the use of dental diagnostic codes. While a limited set of dental diagnostic codes has existed in ICD-9-CM (International Classification of Diseases, Ninth Revision, Clinical Modification), a larger set of dental diagnostic codes (SNODENT, Systematized Nomenclature of Dentistry) has been developed (9). In order to facilitate universal access to a reputable clinical coding system, the US Department of Health and Human Services purchased rights to SNOMED (Systematized Nomenclature of Medicine) Clinical Terms from the College of American Pathologists in 2003. Embedded in the 2004 release was a 6,000+-term dental diagnostic vocabulary, known within the dental community as SNODENT. It was designed as a diagnostic companion to the Current Dental Terminology treatment codes of the American Dental Association (ADA) (15). While the use of diagnostic codes in clinical practice should enable the application of evidence-based protocols for care delivery, and the assessment of their outcomes, diagnostic codes have yet to be widely implemented. Going hand in hand with the need to improve quality measures is the need to greatly expand the evidence base that supports cost-effective decision making by dentists and patients. All of this argues for a future approach to reimbursement that fosters development of quality measures and development of evidence to support cost-effective decision making when selecting treatment and designing benefit programs.

In addition to improving quality and cost-effectiveness within private dental offices, expanding financing to cover services provided by nondental providers may improve access among marginalized groups. As one example, expansion of preventive dental care for children living in low-income families has begun to be addressed through the delivery of these services in primary care medical settings (16). Primary care physicians are overseeing the provision of fluoride therapy (varnishes) and other oral health promotion interventions. Currently, 35 states have mechanisms in their Medicaid dental programs, wherein primary care physicians are reimbursed for providing early screening and oral health education to parents, and preventive services to young children (17). In Washington State, a major private dental insurer has partnered with a private, statewide integrated delivery system to develop and implement a similar mechanism for its commercial accounts (18). In part, the demands of the public and policymakers for solutions to the access issue have led to these changes in reimbursement for delivery of oral health care by nondentists.

"Pay-for-performance" models have been implemented in medicine and represent a key means by which change may come to dentistry. Rather than basing payment on procedures, providers are reimbursed for evidence-based interventions, consistent with achieving measurable health outcomes in a particular population of interest. In other words, this means that the system will need to change from a "volume-based" payment system to a "value-based" based, outcome-oriented payment system, where the "value" desired is the health of the patient. However, there is no agreement yet among dental professionals or even sufficient evidence in many cases on what constitutes an optimal approach to treatment planning for many dental conditions. The ADA has recently developed an "evidence-based dentistry" initiative, but dentists have been slow to adopt this approach. Aside from the dental practice community, it is possible that the dental benefits companies would be the most likely organizations to develop evidence-based protocols, in response to the demands of their clients, the purchasers of commercial dental insurance products, for cost-effective insurance. While "pay-for-performance" models will not dictate care, they will create strong financial incentives for providers to perform

Table 1 Issues to Consider When Evaluating Dental Care Financing

- Is reimbursement permitted for care delivered in nontraditional settings (nursing homes, Head Start, schools)?
- Does the scope of services covered have evidence of (cost) effectiveness?
- Is reimbursement based on the use of diagnostic codes?
- Does the financing mechanism allow reimbursement to new provider types when evidence exists that these providers can safely and effectively deliver appropriate and needed care?
- Are the covered services provided in a manner consistent with the patients risk level and prevention and treatment needs?
- What oral health outcomes are expected to improve as a result of the practitioner's scope of services and does the reimbursement system encourage that outcome?

evidence-based interventions that focus on outcomes. New reimbursement methodologies will likely also include payments to providers for successfully engaging their patients in behavior changes related to risk reduction.

As new payment models are implemented, criteria for evaluating their success must focus on how they increase access and improve health outcomes. Wendling (13) in his paper described Michigan Medicaid Healthy Kids Dental program as an innovative example of improving the utilization rate for this patient population within the private delivery system. The success of this program in Michigan suggests that it could be scalable and reproduced in other states. However, the program did not measure oral health outcomes in their target population and did substantially increase costs. Thus, while increased access may be a necessary prerequisite to achieving improved health outcomes, it will not be possible to determine the desired effects on health without using the appropriate metrics.

In summary, financing of care can be a powerful mechanism for system improvement if there is more alignment between what we pay for, who we pay, and the desired health outcomes. An evaluation metric for dental financing reform is provided in Table 1.

Educational system reforms and evaluating change

Several papers in this special issue suggest that changes in the education of oral health care providers are required to increase access and eliminate disparities in oral health care. Glassman and Subar (5) and Skillman *et al.* (6) focused on educational changes required to reach the disabled, institutionalized, and rural groups, while Edelstein (3) addresses skill sets needed in the dental safety net, and Hilton and Lester (4) address the skills necessary to reduce disparities though workforce education.

Recent workforce data from the American Dental Education Association (ADEA), the ADA, and the Health Resources and Services Administration are sobering (19). As Hilton and Lester (4) note, there are 4,230 Designated Dental Health Profession Shortage Areas (DHPSA) in the United States, which represented about 49 million people, 78 percent of whom were classified as underserved. The estimated number of additional dentists needed to eliminate the DHPSAs is 9,000. Our estimates show that these additional dentists would need to employ an additional 15,200 dental assistants and 11,000 dental hygienists, which is the equivalent of nearly three annual classes of dental hygienists and more than two annual classes of dental assistants. Projections by the ADEA (19) show that about 4,600 dentists will graduate in dental schools in 2010, with a projected increase to 5,325 in 2020. However, over the coming decades, it is likely that the US dentist to population ratio will decline, to approximately 54 dentists per 100,000 persons by 2030 (13).

At the same time, the US population is projected to increase between the years 2000 and 2050 from about 275 million to over 400 million people (20). In addition, increased life expectancy and improvements in oral disease prevention indicates that the number of teeth to be cared for is increasing at a rate faster than the population. Of great significance is the increase in the US "Baby Boomers" who are turning 65 years and older. This 65+ age cohort is expected to increase 16 percent by 2020 and 21 percent by 2050 (20). This generation has benefited from widespread fluoride use in water and toothpaste and has retained more natural teeth than previous generations and demands dental services at a rate similar to younger adults (21). The overall adequacy of the workforce across the dimensions of practice location, skill-set, and propensity toward working with underserved populations is unclear. Wendling (13) notes that there is likely unused capacity in the current delivery system, yet this capacity is not located in the communities needing care. It is in this context that expanding the workforce through development of new oral health practitioners and innovative workforce models has been growing; however, it remains unclear as to whether we need multiple new types of providers or whether one specific new provider model is preferable over all others. Presently, several new oral health practitioners are being advanced by different constituencies. These new practitioner types include:

1 The ADA's Community Dental Health Coordinator, defined as a community health worker with some clinical dental skills. These individuals are targeted to be members of an integrated team led by dentists providing care in underserved areas. The emphasis in their training is on health promotion and disease prevention, administrative skills, patient advocacy, coordinated care and modest clinical interventions, along with collection of diagnostic data. This model is currently being evaluated by Temple University, the University of Oklahoma, and University of California at Los Angeles (22-24).

2 The American Dental Hygienists Association Advanced Dental Hygiene (ADHP) Practitioner model, defined as a dental hygienist who has received advanced education, at the master's level, through a didactic and clinical curriculum (25). This advanced practitioner would be trained to perform an expanded range of services beyond preventive care, including simple restorative services, placing temporary crowns, performing pulpotomies and simple extractions. The ADHP would also have limited prescription writing capability. The implementation of ADHP would require changes in state-based professional licensing requirements.

3 The Dental Therapist Model (including the Pediatric Therapist) is patterned after the 80-year-old New Zealand dental nurse model (9). These programs are generally based on 2 years of post-high school training. Therapists function as part of an integrated team, often in remote areas or in urban areas where there is a large underserved population. The therapists typically work under the general supervision of a dentist, in a close collaborative arrangement with the lead dentist (9,17,22,23). Therapists can provide a range of preventive services, as well as restorations, pulpotomies, and simple extractions in the primary dentition. Importantly, the Dental Therapist model is already found in 50 countries and recently has been implemented in Alaska (9,23).

The Dental Therapist Model has also recently evolved into a "hybrid model" where there is an extended training and education period; an example of which is the new Dental Therapy Program launched in 2009 at the University of Minnesota (UM) School of Dentistry (26). The UM has clearly identified their Dental Therapy program as "A new profession." They offer two related curricula. Each program offers students a rigorous university-based didactic and clinical education alongside dental and dental hygiene students with whom they will work after graduation. They state that this collegial approach to education will ensure a solid educational and clinical preparation, a single standard of care for patients, and a smooth transition from education into professional employment after graduation. Students may enter the Bachelor of Science in Dental Therapy Program after completing 1 year of prerequisite college coursework, while students who have completed a bachelor of science or Bachelor of Arts degree may pursue the Master of Dental Therapy.

4 Although the Nurse Practitioner (NP) Model is an established model in medicine, it may also have significant implications for oral health practice in the future. The NP is beginning to receive consideration for applicability as a new type of oral health practitioner. In this model, the dentist and NP work collaboratively together in a dental office. The NP works within the dental practice as an integral part of a health care team and provides physical assessment of dental patients, screening for systemic disease, and therefore becomes a point of entry for the patient into the health care system. Patients come to the dental office and can receive both basic primary oral health care and primary medical care. This integrated education and clinical care system is being developed and evaluated at New York University (22,27).

Gehshan, at the Pew Children's Dental Health Initiative (17), and Edelstein, from the Children's Dental Health Project (23), have evaluated the various new workforce models summarized above. When reviewing the overall scope of practice, and the range of services offered, it becomes clear that each model is predicated on the provider being a part of an integrated health team. The Dental Therapist Model has the strongest evidence for success, having been evaluated on numerous occasions over the past 5 decades and in multiple countries (9,23). It has been shown to be effective in bringing safe, high-quality oral health care to underserved communities, and is likely the most cost-effective model, in part given its limited, post-high school education requirements.

As these new models are developed, it may be instructive to remember that other models have been tried in years past and the reasons they did not survive. For example, in the 1970s, the Forsyth Institute in Boston developed a very sophisticated expanded function dental hygiene program where the graduates provided restorative services as well as the full range of dental hygiene (7). In addition, the University of Kentucky and the University of Iowa, in the same relative time frame, and Howard University in the 1960s conducted their own successful study on the use of expanded function dental assistants (7,9,23). Although, these programs were discontinued because of intense political pressure brought to bear on the institutions by organized dentistry that was adamantly opposed to new workforce practitioners, Kentucky's state dental practice act continues to allow for expanded function dental assistants as part of private dental practice (23) as do several other states.

Fortunately, dental education has begun to embrace positive change. Many dental schools now offer course work in evidence-based dentistry and cultural competence. Accreditation requirements have evolved to ensure that graduates have the ability to work with older adults and patients that are medically complex. In addition to these important skills, graduates should also have an understanding of the complex sociocultural and economic barriers that prevent many from accessing care. The Arizona School of Dentistry and Oral Health, established in 2003, exemplifies how these issues can be incorporated into a professional dental curriculum.

The dental education community will need to take a leadership role to ensure that graduates of current training programs as well as graduates from newly developed programs have the knowledge, skills, and attitudes required to help patients overcome the complex sociocultural and economic barriers to care now experienced by so many. By taking a leadership role, and working with stakeholders in the patient and dental practice communities, dental education

Table 2 Issues to Consider When Evaluating Dental Education Reform Is Dental Education

- Developing, implementing, and evaluating new and novel workforce models?
- Willing to advocate for policy change at the federal and state levels to enable any well-constructed workforce models to be implemented?
- Willing to partner with the appropriate communities of interest to make new workforce models succeed?
- Willing to address the public need and effective demand?
- Creating systems approaches to educating dental students side by side with dental hygienists, dental assistants, nurses, physicians, pharmacists, and other health professions such that the graduates are enabled to work collaboratively and develop the concept of the dental/medical home?
- Developing practitioners who are critical thinkers and lifelong learners and who can evaluate new technologies and who can embrace change in the health care workforce?
- Developing more cost-effective ways to deliver education and clinical care?
- Embracing and investing in new diagnostic, prevention, and therapeutic technologies that can shorten the translation of science to clinical practice?
- Training students to function in nontraditional settings, such as special patient populations and rural health care settings?
- Educating and training the practitioner who has real sensitivity to the community and who can practice culturally competent care?
- Imbuing in their students the highest ethical expectations which are a necessary antecedent to accepting new and novel ways to practice?
- Willing to engage the accrediting agencies and the national testing agencies to advocate for supporting the new workforce models?
- Willing to engage the insurers and federal and state legislators to assure that reimbursements match the expanded functions and provide for payment for preventive and health promotion services?
- Developing effective coalitions to create the new health care team?
- Developing models of care in their own clinics that are patient-centered, competency-based, and inclusive of various components of the health care team?
- Willing to travel to the communities where the greatest need exists and work with community and social workers and health care advocates and navigators to bring direct services to the community?
- Willing to engage in "disruptive innovation" to advance education and clinical care?
- Advocating for new funding streams by foundations?
- Willing to let "others" develop the next generation of health care workforce?
- Willing to challenge organized dentistry, when necessary?

can catalyze workforce change through curricular innovation. Dental education is playing a role in expanding the scope of providers through their collaboration with professional organizations, the federal government, and foundations, to develop curricula and implement training programs for the new provider types mentioned above (27). There is also more emphasis in some schools on working in interdisciplinary teams, which is believed to improve overall health outcomes. To facilitate this change, we offer in Table 2 a set of questions for those working to improve dental education. We envision these questions as an aid in both designing and evaluating educational change.

Policy issues

As noted in all the contributions in this *Journal of Public Health Dentistry* special issue, improving oral health for the US population will require policy change at both the state and national level. There are two overarching policy issues; the regulation of dental providers through state practice acts and the structure and substance of dental insurance coverage.

First, it is unlikely that any workforce innovations will be successful unless regulation allows for more flexibility for practitioners to provide primary and/or preventive dental services. At the state level, there is a need for changes in most state dental practice acts to permit innovation such as the deployment of new workforce models. To improve the access for populations such as those discussed by Glassman and Subar (5) and Skillman *et al*. (6), changes in regulations regarding scope of practice and supervision requirements for existing or new dental provider types will need to be addressed. Furthermore, as state legislatures seek ways to improve access to oral health care and expand the dental safety net they may need to modify practice acts for nondental professionals, including physicians, nurses, and physician's assistants.

The modification of state practice acts requires a state-by-state approach which is inherently slow and produces highly variable outcomes due to the highly politicized nature of this process. Evaluation of new provider models should proceed rapidly so that evidence in support of the effectiveness of all of the new workforce innovations is available to support policy discussions within each state. States can support pilots through mechanisms allowing temporary modifications to the scopes of practice such as California's Health Workforce Pilot Project Program (28). A critical component of this work will be the rapid development of accepted evaluation criteria that can be used to evaluate various models against the desired outcomes of improved health outcomes, access to care, and reduced oral health disparities.

A complementary approach would be to use elements of the federal health care systems as a laboratory for testing and evaluating new workforce models through demonstration projects. Making needed change in federal regulations covering dental care delivery could occur rather quickly. New workforce models could then be deployed and evaluated within federal venues such as the military, Department of Veterans Affairs, or the US Public Health Service dental programs, including the Indian Health Service. The population served by these systems tends to have high dental needs and therefore provides great opportunities to reduce disparities in access and oral health outcomes.

Finally, as noted by Glassman and Subar (5), improving regulatory guidelines for institutions such as nursing homes could improve oral health care for the populations that they serve. At the federal level, regulatory changes for federally qualified health centers and community health centers could improve the efficiency and effectiveness of care delivery through various mechanisms, particularly with new workforce participants and/or broadened scope of practice.

The second key policy issue is the need for revision of regulation covering eligibility and availability of public dental insurance, and related reimbursement issues. For programs such as Medicaid and Head Start, eligibility criteria should be reviewed. In addition to expansions such as those included in *The Patient Protection and Affordable Care Act of 2010*, streamlining enrollment and making coverage sustainable would help to improve access for many children. Additionally, the public financing system should expand the types of providers eligible to bill for services provided, as well as expanding the range of reimbursable services, including preventive or restorative care delivered in nontraditional settings such as schools and mobile clinics. Serious consideration should also be given to extending dental coverage through Medicare to all older adults. Adding dental coverage to Medicare, and expanding the types of providers who can be reimbursed by this coverage, could go a long way to improving the oral health of seniors, particularly those in institutions and who have lost employer-based coverage as a result of retirement.

Conclusion

This special issue of the *Journal of Public Health Dentistry* identifies opportunities associated with new oral health workforce models for improving access to oral health care and reducing disparities in oral health. Three areas critical to the successful implementation of these new workforce models are payment systems, educational programs, and policy change at the state and federal levels. The successful implementation of any new workforce models will require systemic changes to the oral health education and delivery systems. Evaluation of these models must include assessments of the changes within these three domains. This paper provided a framework around the policy issues and identified a number of criteria within these domains that could be incorporated into programs designed to evaluate the success of both existing as well as new oral health practitioner models.

Conflict of interest

LCN serves as Vice President, Chief Clinical Officer for DENTSPLY International. The opinions noted in this article represent her views and not those of DENTSPLY International. The other authors have no conflicts to declare.

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