Evidence-Based Dentistry and Health Services Research: Is One Possible Without the Other?

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Abstract: Barriers have been identified in the literature to the implementation of evidence-based practice in dentistry. A major concern is the lack of rigorous evidence for clinical practices. Little attention has been given to the lack of rigorous health services research. Evidence-based practice is more about effectiveness than efficacy and will influence the type of research that characterizes health services research (HSR) because it involves levels of data below that of the random controlled trials, involves questions about the appropriateness of care, and involves examining the structure, process, and outcomes of care. The need for HSR can be seen by examining the appropriateness of dental care and health-related quality of life outcomes. The conclusion to be drawn is that evidence-based dentistry needs HSR if it is to fulfill the promise currently held for it in the profession.

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The same forces that gave rise to evidence-based medicine are now apparent in dentistry. Whether one sees this as a long overdue process or the harbinger of bad times for the autonomy of the dentist, probably depends a lot on what one feels about traditional dentistry. In one interpretation, traditional dentistry is long on opinion and very short on evidence. In another, traditional dentistry has been guided by the wisdom of experts to the betterment of patient care and the advancement of the profession. Whatever the truth of either position, at the very least dentistry has a new mantra, but whether it will, or can, live or die by it remains to be seen.

Concern and opposition to evidence-based dentistry is already being expressed in opinion pieces in the journals. This has led one commentator to suggest that those proselytizing evidence-based dentistry should, first, consider changing the name to something that stresses improvement for patients and, second, use the evidence from behavioral science about changing human behavior if they wish to change dentists. “It may be,” he suggests, “that the best way to convince dentists to practice evidence-based care is to point to opportunities they are missing.”

What is clear is that evidence-based dentistry poses some particular challenges to the profession, many of which have been discussed in previous articles. They include resistance from dentists, misinformation about evidence-based practice, the threat of the loss of clinical autonomy, the generation of guidelines, their use by third-party payors, inappropriate dental education, and the dearth of evidence for much of dentistry and the current impossibility of justifying much of practice with good quality evidence. Even those who support evidence-based dentistry recognize that its practice involves a set of skills for dentists that are different from the usual. At the very minimum it involves reading current literature, being able to critically appraise the literature, being able to synthesize the literature or appraise syntheses, drawing conclusions relevant to clinical practice, and applying the results to individual patients. While evidence-based dentistry does offer the opportunity for the practice of dentistry to enter a new era, it is worth recalling an old maxim—“the trouble with opportunity is it always comes disguised as hard work.” It is also provident to keep in mind that, despite the great expectations for evidence-based practice in both medicine and dentistry, there is scant evidence yet that it results in better outcomes.
Evidence-Based Dentistry

"When I use a word," Humpty Dumpty said, in a rather scornful tone, 'it means just what I choose it to mean—neither more nor less.' 'The question is,' said Alice, 'whether you can make words mean so many different things.' 'The question is', said Humpty Dumpty, 'which is to be master—that's all.'"

While the term "evidence-based dentistry" is now widely used, it is not clear everybody means the same thing by it. A 1997 report in the Journal of Dental Education is titled “Symposium: Practical Evidence-Based Management of the Initial Caries Lesion,” but it contains not a single systematic review of evidence. However, most discussion in dentistry on evidence-based practice begins with the definition formulated for medicine that it is “the conscientious, explicit and judicious use of the current best evidence in making decisions about the care of individual patients. The practice of evidence-based medicine means integrating individual clinical expertise with the best available external clinical evidence from systematic research.” Further, the practice of EBM, then, is the process of life-long, self-directed learning in which caring for our own patients creates the need for clinically important information about diagnosis, prognosis, therapy, and other clinical and health issues. This is identical to the definition most commonly used in dentistry.

This type of practice is contrasted with tradition-based dental care, which is characterized as "practical, prudent, and personal." In traditional dental care, emphasis is placed on the dentist’s accumulated knowledge and experience, adherence to accepted standards, and the opinion of experts and peers. Evidence-based practice, in contrast, places a premium on using current evidence to solve clinical questions. It presupposes two things about the dentist: one, that he or she is conversant with the current literature, and two, that he or she is competent to evaluate it. The first requires that dentists read the scientific literature, particularly in clinical research, and the second requires that they can critically appraise the literature. Niederman and Badovinac identify five steps in clinical decision making that the evidence-based dentist must be involved in: 1) converting clinical information needs into an answerable question; 2) using electronic databases to find available evidence; 3) critically appraising the evidence for validity and importance; 4) integrating the appraisal with the patient’s perceived needs and applying these results in clinical practice; and 5) evaluating their own performance.

Clearly, evidence-based practice will require a different approach to dental education, either through continuing education for practitioners or through a revised dental school curriculum. In medicine, this has meant a paradigm shift in medical education. Accessing the literature requires acquiring the skills to conduct on-line literature searches in an efficient manner. Evaluating the quality of evidence requires an understanding of research design, epidemiology, and statistical analysis. The clinician also needs to master the new methodologies, such as meta-analysis, for determining the quality of the literature and for synthesizing the results of studies. In medicine, this has resulted in new forms of medical education such as critical appraisal of the literature, continuing education courses, articles published by major journals such as the British Medical Journal on appraising the literature, and numerous books introducing evidence-based practice. Clearly it also involves behavioral changes on the part of health care providers.

While specialty groups in dentistry such as periodontics and orthodontics have begun to take up the challenge of evidence-based practice, they face a major challenge: the lack of evidence. In addition, public health researchers have conducted studies on the efficacy and effectiveness of preventive agents/interventions such as fluoride and sealants. For many of the commonly accepted procedures in dentistry such as the replacement of single missing posterior teeth, there is no supporting evidence. In a recently conducted systematic review of management of caries, only thirty-nine studies were found for diagnosis confirmed by histological validation, only five studies were found for management of non-cavitated lesions, and only twenty-two studies for management of caries-active individuals. The number of randomly controlled trials for these same areas was
also very small. The web site for Oral Health Group reports only three systematic reviews for the Cochrane Collaboration (an international effort to document all trials) that have been completed to date with another twenty-one being planned. The Cochrane Oral Health Group lists only sixty-three systematic reviews ever being done. To put this in context, the web site for neonatal care lists twenty-five completed reviews and over 200 reviews planned. Niederman and Badovinac compared the mean number of articles published per year in dentistry to eight medical specialties and the number of published meta-analyses for the years 1996-98. In both instances, the mean number of articles for dentistry was significantly less. Two journals have been established in dentistry to provide a forum for presentation of quality studies: *Evidence-Based Dentistry* published by the *British Dental Journal*, and the recently announced *Evidence-Based Dental Practice* to be published by Mosby Inc. in the summer of 2001. The lack of studies reporting quality clinical trials in dentistry is not likely to change unless a fundamental shift occurs in the funding of research in dentistry. Bader et al. in 1998 noted that the National Institute of Dental and Craniofacial Research (NIDCR) funded only eighteen clinical trials, the sine qua non of evidence-based practice, from a total of over 860 projects funded by NIH overall. Only three clinical trials in dentistry were funded by the Agency for Health Care Policy and Research (since renamed the Agency for Health Research Quality).

We are left with the conclusion therefore that there are two significant gaps in the quest for evidence-based practice in dentistry. There is a gap between what evidence currently exists for the effectiveness of dental therapy and the actual practice. But even assuming the profession, like the character from Dickens’ *David Copperfield* says, “Barkis is willing,” there is the gap between what evidence exists and what needs to exist for dentistry to properly claim its practices are evidence-based. This gap can be most clearly seen by examining health services research and dentistry.

**Health Services Research and Dentistry**

The purpose of Health Services Research (HSR) was defined by the Institute of Medicine in a major report in 1979 as the investigation of the relationship among social structure, process, and outcomes for personal health services. Personal health services involves a transaction between a client and a provider to promote health. For Andersen et al., this definition requires that HSR must include structure and/or process. They are less convinced that the definition necessarily involves outcomes but this, they feel, is fundamental to determining its policy relevance.

The structural component includes personnel, facilities, services available, organizational features, and financing. Process is the transaction that occurs between the provider and the patient. The strength of HRS is the breadth of its focus which goes beyond the disease and interventions of clinical studies to include the total organization of the care delivery. This is also its major contribution to evidence-based practice.

The dominant focus of evidence-based practice has been the randomized controlled trial (RCT). While other forms of study design (such as non-random trials, cohort studies, simple pre post case series) may be included in a systematic literature review, the RCT is given most weight since it is the design that most clearly establishes efficacy. Unfortunately, such studies generally test a therapy under ideal conditions and often with homogeneous populations to ensure comparability of the groups when comparing outcomes. But evidence-based practice ultimately requires therapies that can be applied in normal practice, that is, effectiveness studies. While on logical grounds a therapy without any efficacy will not be effective, a therapy that has efficacy may not have effectiveness when applied to heterogeneous populations and normal practice conditions. Efficacy involves testing a therapy under ideal conditions in which most of the variables can be controlled and where the outcome can therefore be attributed to the therapy being tested. Effectiveness involves testing the therapy under normal practice conditions, in the real world. Furthermore therapies with equal, or comparable, efficacy may differ considerably in terms of effectiveness. As other researchers have said, “Assessing efficacy is not equivalent to assessing effectiveness.”

HSR is conducted at the clinical level, the institutional level, the systemic level, and the contextual level. The structure and process across organization types (such as managed care) can affect efficacy and clinical outcomes. At the systemic level,
the way in which health care is organized (such as a nationally funded and organized health care system) clearly impacts the patient/provider transaction. At the contextual level, other policies (such as welfare policy) also have impacts.

A key structural component of HSR is finances. While HSR has made numerous contributions to understanding health care, its focus on outcomes and linking these to structure and process makes it a core consideration in any discussion about evidence. Ultimately, evidence-based practice is about adopting the most efficacious, effective therapies with the best outcomes within real practices with the resources available. Are the outcomes the best with the resources that are achievable, or do the resources and services being used make a difference in terms of outcome? Cost-effectiveness and cost-benefit analyses must also be part of the picture.\textsuperscript{45,46} In this way HSR introduces a badly needed dose of realism into the evidence-based practice movement. The point of studying outcomes and effectiveness is to improve the quality of care\textsuperscript{48} and provide better outcomes for patients.\textsuperscript{48}

The situation of dentistry, however, is different from that of medicine. Much of dental care is paid out-of-pocket by the patient, and not all of it is focused on disease. Areas such as esthetic dentistry and orthodontic dentistry provide examples of such dental care. Appropriateness of care in dentistry in many areas, therefore, is of a different magnitude of seriousness than, say, bypass surgery or hysterectomies in medicine. In esthetic dentistry the values of the patient play a significant role. Whereas treatment for oral cancer may be judged as a need, treatment for whiter teeth may simply be a want. Appropriateness studies pose some particular challenges in dentistry as they do in cosmetic surgery in medicine.

Although a full discussion of HSR is beyond the scope of this article, two areas will be discussed as exemplars of what it can contribute to evidence-based practice: appropriateness of care and health-related quality of life measures.

**Appropriateness of Care**

Appropriate care is generally defined as that care that provides sufficient benefit to the patient as to warrant doing it. In any clinical practice, there will be patient care that is both appropriate and inappropriate. Clinical practice will, in some respects, always represent a balance between these two factors. The challenge for any health profession, however, is to promote that which is appropriate and diminish that which is not.

Several investigators have demonstrated both small- and large-scale variations in the amount of medical care delivered to different populations beyond that expected due to variations in the populations themselves.\textsuperscript{49,50} The incidence and prevalence of disease, socioeconomic factors, and underlying differences in the health care delivery system have all been examined and shown to contribute to, though not adequately explain, the observed variations.\textsuperscript{54} Research by investigators at the RAND Corporation (now called RAND) and UCLA has shown that a substantial proportion of medical care is inappropriate.\textsuperscript{55-57} Early studies on the rates of appropriate and inappropriate use for such procedures as carotid endarterectomy were 35 percent and 32 percent respectively, while those for coronary artery bypass graft surgery were 56 percent and 14 percent.\textsuperscript{58,59} Inappropriate treatment can be harmful and is generally considered antithetical to good quality care.\textsuperscript{60}

The same forces that developed an interest in the appropriateness of medical care are now operative in dentistry. There is increasing evidence in dentistry of tremendous variations in both procedures and costs in homogeneous patient populations.\textsuperscript{61} Studies have also shown considerable variation in dentists’ clinical decisions even when controlling for patient differences.\textsuperscript{62} There has been very little support, however, for research that evaluates the appropriateness of care in dentistry over the past two decades.\textsuperscript{63-65} Studies have examined the appropriateness of referrals for periradicular surgery,\textsuperscript{66} treatment of the elderly,\textsuperscript{67} and orthodontic treatment.\textsuperscript{58} Maas\textsuperscript{69} notes that research from the Agency for Healthcare Research and Quality (AHRQ) confirms the need for research on the appropriateness of dental care.

No rigorous evidence from random controlled trials (RCTs) exists to support the effectiveness of many of the standard procedures used in dentistry.\textsuperscript{4,70} In situations where strong evidence derived from random trials is either not available or not possible, as in the situation where no placebo or control group is feasible, the profession faces a particular challenge. Furthermore, as a practical matter, the resources and time needed to correct this lack of RCTs are not likely to be found anytime soon. Where strong RCT evidence does exist, however, the question of appropriateness is largely answered. Where evidence does not exist, the result is a form of therapeutic anarchy (ev-
As Marcus and Spolsky note, while evidence-based practice is the goal, there are always substantial gaps in the evidence. HSR has developed the expert panel as a way of dealing with this gap for questions of appropriateness. This method combines the systematic literature review with the clinical acumen of a panel of expert practitioners and academics. The call for appropriateness studies begging the methodological question of how appropriateness is to be judged and the validity of competing methods for developing measures of appropriateness. The dilemmas surrounding the establishment of criteria of appropriateness include such questions as whether they should be based on common practice (usual and customary practice) or best practices; whether they should be established by the “experts” in the field, such as the specialty groups, or by the rank and file; and whether they should be based entirely on research findings (evidence-based) or clinical experience. Dentistry has successfully used the consensus conference process method to deal with the appropriate use of dental implants. One approach to appropriateness is to compare need and treatment. Another is to look at utilization rates and services provided. Variation in services does not necessarily mean inappropriate or unnecessary services are being provided. Inappropriate care can be overtreatment, undertreatment, or both, and rates alone cannot distinguish among these three.

However, the method most frequently used in conjunction with field studies to determine the rate of inappropriate care in practice has been the RAND expert panel. The process involves three distinct stages. In the first stage, the research staff conducts an extensive literature review and then develops an initial set of indications for undertaking a procedure, based on the literature review and discussions with experts in the field. The objective is to include all the indications for a given procedure that might arise in practice.

In the second stage, a modified delphi method is used. The lists of indications are circulated independently to the panelists, who are also provided with the literature review and asked to rate the appropriateness of indications for a given procedure. Panelists are requested to consider a typical general practice within the United States in the year the study is conducted (not exemplary practice but usual and customary). The ratings are from 1 to 9, with 1 representing extremely inappropriate and 9 extremely appropriate. “Appropriate” here means that the expected health benefit to the patient (relief of symptoms, improved functional capacity, reduction of anxiety, etc.) exceeds expected health risks (pain, discomfort, etc.) by a sufficiently wide margin that the procedure is worth doing.

In the third stage, the panels are brought together face to face, and the results of these ratings are circulated. Each panelist is shown his or her rating for each indication, as well as the distribution of ratings of the panel. Only the panelist knows his or her individual rating, but all know the group’s ratings. Following group discussions and revising of the indications, the panels re-rate the indications.

From the second rating it is possible to determine the degrees of consensus among the panelists and to calculate the average median ratings and the average dispersion measures, for the procedures. By this method, criteria for measuring the appropriateness or inappropriateness of a procedure are established. These then can be used to measure the proportion of appropriate or inappropriate care being given in practice by extracting the patient files and evaluating them using the criteria for which there was consensus.

The validity of the RAND consensus panel method has been extensively researched. Studies have examined the relationship between ratings and the literature, face and content validity and construct validity. Studies have looked at test-retest reliability, compared panels occurring in different countries on the same procedures, compared panels occurring at different times and investigated the impact of panel membership on the judgments of appropriateness. These studies show that extreme variation across the panels does not occur. A formal test of reproducibility of the RAND panels has been concluded. This study tested the reliability of three parallel panels for two procedures—hysterectomy and coronary revascularization—conducted within the same time frame. Comparing the reproducibility of the panels with what physicians do daily, they concluded that the RAND method is much less variable than physicians’ making independent decisions. This method has enabled RAND to determine the inappropriate rate for such procedures as manipulation for low back pain, carotid endarterectomy, coronary artery bypass surgery, and hysterectomies. No such
field study in appropriateness has ever been conducted in dentistry.

It is difficult to see how evidence-based dentistry can be advanced without some focus on appropriateness and necessity of care. As noted by Bader et al., it is difficult to see how evidence-based dentistry can be advanced without some focus on appropriateness and necessity of care. As noted by Bader et al., if outcome measures are to be a significant part of dentistry, “Only outcomes where appropriate treatment can have a substantial beneficial effect should be considered” (p. 33). They further note however that, to date, in quality assessment of care in dentistry, no measures are used that assess the appropriateness of the diagnosis or the treatment plan. Bader et al. conclude, “what is lacking is a sense of how to measure the scope and thoroughness of the provision of appropriate care” (p. 36). Similarly, Marcus and Spolsky see the search for appropriate care as the basis of the search for evidence-based practice.

Health-Related Quality of Life (HRQOL)

Although Andersen, Davidson, and Ganz distinguish quality of life research from HSR proper, this distinction is increasingly difficult to maintain insofar as the measurement of health-related quality of life (HRQOL) has become an integral part of outcome measurement for HSR. The essential feature of this type of research is it moves the perspective from the provider to the patient. Dentistry has followed medicine in its development of measures to assess the health status of the patient. The earliest oral health measures were objective indices of disease based on the judgment of the dentist. Over time these have been supplemented with measures that are often subjective and patient centered and psychosocial in nature. The quality of life measures continue this trend with a focus on those things important to the patient (discomfort, ability to function, impact on socializing, etc.).

Within the field of oral health there has been considerable work from the 1980s onward in developing oral health-related quality of health measures. Much of this work has focused on the elderly and work culminated in a conference in 1996 on measuring oral health and the quality of life. While the dental profession was somewhat slow to start developing measures of oral health that were not done by health professionals, and in particular measures of functioning, a range of instruments is now available for measuring oral HRQOL and clearly articulated theoretical bases for these measures. Oral HRQOL has been shown to cover a set of domains similar to those of generic HRQOL, and research has shown that it is also affected by the same clinical factors.

There are several instruments for summarizing oral health status. The instruments developed specifically for oral health-related quality of life are frequently derivative of more generic ones. From the Sickness Impact Profile (SIP) there is a Dental Impact Profile (DIP) and the Oral Health Impact Profile (OHIP). From the Impact on Daily Living scale there is a Dental Impact on Daily Living scale (DIDL). There is some evidence that the oral HRQOL measures discriminate better between oral clinically distinct groups than the SF 36, a widely used measure of health status developed initially at RAND.

The interest within dentistry in this area of research, however, has been very recent. Yet it is difficult to think of an area more crucial to determine evidence-based practice than evidence that the outcomes are favorable to the patient and valued by the patient. A technically successful outcome that confers no benefit on the patient in the opinion of the patient would be a somewhat dubious achievement. Providing a child with up to twelve metal crowns on front teeth, as was recently done in Texas for children under Medicare, may solve the oral health problem (caries) technically, but results in social stigma for the child. For many outcomes, the patient is the only person competent to evaluate the desirability and value of care. Patients’ utilities and values should play an important part in selecting the appropriate care. However, there is scant evidence that this type of work is making its way into evidence-based practice.

Dentistry and Health Services Research

The two areas of HRS described above—appropriateness of care and HRQOL—illustrate two distinct problems: regarding studies of appropriateness of care, dentistry suffers from almost total abstinence. The methods to do this kind of research exist in other fields and have been applied in professions like chiropractic that are quite similar to dentistry in terms of organization of the delivery of care (that is, both dentistry and chiropractic have a high
proportion of individual or small group practices isolated from major network databases); but these methods have not been picked up by the dental profession. The variations in care that seem unexplainable by the distribution of disease or need—which gave rise to appropriateness studies in medicine—have been well documented in the dental profession as well and in fact are widely quoted in the evidence-based practice literature as one of the factors giving rise to evidence-based practice dentistry. There is some irony in the fact that dentistry has gone from the identified problem to evidence-based practice without first identifying how much of the clinical variation is due to inappropriate care. The very expensive, and often opposed, development of clinical guidelines is itself suspect if it deals with issues that constitute a very small percentage of actual practice. Where the rate of inappropriate care is large, the need for guidelines may be large; but where it is extremely low, one might want to question the use of resources in this way, particularly when the evidence for successful implementation of guidelines is also not strong.

In the second area, HRQOL, and oral health status instruments, it is clear that dental researchers have been engaged and in fact have formulated a strong theoretical base for this work. The problem here is not abstinence but analytic interruptus—the failure to follow through on the integration of such research and instruments into assessing evidence-based practice.

Part of the problem is clearly related to the position of health services research within dentistry. While in medicine, HSR has become widely institutionalized either as departments or institutes in schools of medicine or academic health centers with a financial infrastructure for support, no such comparative development has occurred in dentistry. In addition to institutional support, medicine has also retained such prestigious development programs as the Robert Wood Johnson Clinical Scholars program which, at institutions like UCLA, has produced several generations of health services researchers. Much of the work done by UCLA/RAND on practice variations and inappropriate care has been done by graduates of the Robert Wood Johnson Clinical Scholars program.

Similar expectations were also held for the Robert Wood Johnson Dental Services Scholars Program. In the special issue of the *Journal of Dental Education* for the first annual conference of the program, this high expectation was expressed: “Dental schools must develop a cadre of clinical faculty who can produce the new knowledge and train others in health services research. The program allows for a ‘multiplier’ effect to occur within dental institutions, with the expectation that dental services research will eventually have as great an impact on the delivery of care as has biomedical research.” Clinical research was conceived as the heart of the program: “The questions that give precision to health studies are clinical questions, and the evidence that gives validity to the answers is clinical evidence.” At the same meeting, the National Institute of Dental Research (now NIDCR) made a strong statement about the importance of health services research but acknowledged that over the years NIDR “has supported some research that the idealist might classify as health services research.” Presumably the less idealistic might have difficulty seeing much of this as HSR.

The opinion of those who participated in the UCLA Robert Wood Johnson Dental Services Scholars Program, which started in 1983 was that it was highly successful. In total, thirty individuals were trained in the program, and of the thirteen trained UCLA scholars, ten have subsequently pursued an academic career. Unfortunately, the Dental Scholars program was not continued by Robert Wood Johnson. Nor has NIDCR lived up to the promise expressed in 1983. As noted earlier, Bader et al. in a 1998 survey of NIDCR projects could identify only eighteen dealing with treatment outcomes. While we cannot assume all these were health services research or that the only health services research focused on clinical outcomes, it is highly likely that this closely represents the funded studies in HSR in dentistry from these two agencies. Given the new emphasis at AHRQ on evidence-based medicine, including the funding of at least one center for dentistry, this will hopefully change. However, without sufficient researchers trained in HSR who focus on oral health issues, it is not likely to change rapidly or soon.

**Conclusion**

A strong case can be made that, without an HSR component, the move towards evidence-based dentistry will remain more a promise than a reality. The major concerns of HSR—such as linking structure, process, and outcome; measuring quality of care; evaluating access, cost, services, and utilization of care; measuring health care need and health risks;
assessing patient measures such as satisfaction and health-related quality of life; and appropriateness research—are all crucially important to evidence-based dentistry. Furthermore, HSR brings methodologies that can enrich the evidence-based paradigm. HSR has always gone beyond the random controlled trial and used a wide range of observational study methods. Health services researchers use qualitative methods to provide deep understanding of the health encounter, drawing widely from research in such social sciences as economics, sociology, and anthropology for their work’s theoretical foundations, conceptualizations, and methodologies. Their interest in effectiveness provides a very necessary antidote to the concentration on efficacy studies. However, a critical mass of researchers, institutional support, and research funding is required to allow this contribution from HSR to be made in dentistry. Medicine stands as strong empirical evidence of what HSR can contribute to evidence-based practice when all of these conditions are met. It should be noted however that, even within the field of HSR, concerns have been raised about the future for health services researchers. If dentistry is to benefit from HSR, the logical start for the development of researchers and methods is in the dental schools. They are also, with their teaching clinics, a logical place to start to collect HSR data. The report by the Institute of Medicine on dental education laid out a program that was thought to be crucial for professional renewal. As Grembowski notes, key among its recommendations was a new focus on health outcomes, reduction in disparities in oral health status and access to care, the development of outcome-oriented patient care models, the integration of oral health into primary care, and the development of a data infrastructure. He further notes that “none of these can be accomplished without health services research” (p. 10).

A strong case can also be made for the reestablishment of a program like the Robert Wood Johnson Clinical Scholars program, funded either privately or by federal funding. The evidence of the impact of the program in medicine is clear, and although the dental program had a relatively short life, its impact was impressive. This might also be a program ADEA could push for support as a significant part of dental education.

HSR is very interdisciplinary, involving as it does such disciplines as epidemiology, behavioral science, economics, and public health. It is clear that, in the development of HSR, dentistry will need to develop collaborative programs to ensure that graduate students who are attracted into the program receive mentoring and training from the relevant experts. Again, the Robert Wood Johnson Clinical Scholars program in medicine provides an ideal model of how to do this.

Within the undergraduate dental program, HSR should be introduced to students. A natural place for this to occur is within public health and community dentistry. Where these are strong programs and constitute a significant part of the curriculum, doing so can be a seamless integration.

REFERENCES


