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Pay for performance in dentistry: what we know

Andreea Voinea-Griffin¹, D. Brad Rindal², Jeffrey L. Fellows³, Andrei Barasch⁴, Gregg H. Gilbert⁵, and Monika M. Safford⁶ for the DPBRN Collaborative Group⁷

¹ Postdoctoral Fellow in the Department of General Dental Sciences, University of Alabama at Birmingham, Birmingham, AL.

² Investigator and dental health provider at the HealthPartners, Minneapolis, MN.

³ Investigator at the Center for Health Research, Kaiser Permanente Northwest, Portland, OR.

⁴ Associate Professor in the Department of General Dental Sciences, University of Alabama at Birmingham, Birmingham, AL.

⁵ Professor and Chair of the Department of General Dental Sciences, University of Alabama at Birmingham, Birmingham, AL.

⁶ Associate Professor in the Division of Preventive Medicine, School of Medicine, University of Alabama at Birmingham, Birmingham, AL.

⁷ The DPBRN Collaborative Group comprises practitioner-investigators, faculty investigators, and staff investigators who contributed to this DPBRN activity. A list of these persons is at <http://www.dpbrn.org/users/publications/Default.aspx>

Abstract

Little is known about the effect of a *Pay for Performance* system (P4P) on primary medical care providers and even less is known about its potential impact in dentistry. Based on the growing acceptance of performance-based reimbursements in medicine and the dissemination of innovative technologies, structures, and processes of care from medical to dental services, it is likely that the dental profession will face performance-based payments in the not-too-distant future. In this paper, we present the current experience of P4P in primary medical care that has relevance to dentistry and discuss the dental performance-based programs to date. Taking into consideration these lessons, the structure of dental service delivery in the US, and the paucity of evidence-based quality indicators in dentistry, we provide several guidelines for the design of P4P pilot programs for dental services. We conclude that large-scale implementation of P4P for dentistry may not be a realistic option before significant progress is achieved in quality of dental care indicators.

Keywords

Pay for performance; quality improvement; dental care; evidence-based dentistry

Background

Pay for Performance (P4P) is an incentive system aimed at linking provider reimbursement to the quality of care provided (Epstein, Lee, & Hamel, 2004). This system is based on Skinner's operant conditioning theory whereby "the behavior is followed by a consequence, and the nature of the consequence modifies the [...] tendency to repeat the behavior in the future" (Boeree, 1998, 2006). However, the relevance of this theory to highly skilled professionals and health system organizations is not clear. Recent reviews of P4P found weak-to-modest positive effects on health care delivery (Petersen, Woodard, Urech, Daw, & Sookanan, 2006; Rosenthal, Frank, Li, & Epstein, 2005) and mixed provider acceptance

(Steiger, 2005). Moreover, P4P was sometimes implemented as a mandatory program with financial penalties for not achieving performance targets, an approach unpopular among providers. An example is the recent transition of Centers for Medicare and Medicaid Services (CMS) from pay for reporting to pay for performance for “never events” such as hospital acquired infections (Arias, 2008; CMS, 2008). In medicine, the success of physician participation in quality improvement programs has been dependent not only on financial incentives but also on the alignment between these incentives, the clinical areas perceived as important, and the professional and ethical values of the physicians (Spooner, Chapple, & Roland, 2001).

Managed care organizations (MCOs) and the CMS initiated numerous performance-based programs (IOM, 2007; Rosenthal, Landon, Normand, Frank, & Epstein, 2006), but their implementation proved to be challenging (Bozic, Smith, & Mauerhan, 2007; NCQA, 2006). Nevertheless, P4P programs continue to expand (Ferman, 2004) and professional organizations are closely monitoring this trend. The Joint Commission on Accreditation for Healthcare Organizations (JCAHO) established P4P guidelines for healthcare organizations (2005) and the American Medical Association (AMA) adopted P4P principles in the same year (2005). The American Dental Association (ADA) outlined the prerequisites for professional acceptance of a P4P program (2006c), and this preemptive position seems warranted based on the P4P trends occurring in medicine. Given that many medical innovations are eventually transferred to dental services, P4P could well be implemented in dentistry in the near future. Therefore, despite differences between medical and dental care, a thorough look at primary care P4P programs should be of interest to the dental profession. Although quite limited, it is best to also review the current experience with performance-linked reimbursement for dental services. Our objective for this paper is to: (1) review the state of the science in P4P as applied to dentistry; (2) propose key guidelines for meaningful P4P pilot programs in dentistry; and (3) outline the possible future of P4P for dental care.

Lessons learned from P4P in primary care

In 2003, the British National Health Service (NHS) engaged in the most ambitious P4P program in the world (Shekelle, 2003). The program represented a radical change from the NHS payment methodology, set numerous performance targets and pledged sizeable payments to providers who achieved those targets. These payments were supplemental to the regular reimbursement for physician services. The elaborate program included 76 quality indicators in 10 clinical domains of care, 56 process indicators, 4 measures linked to patients’ experiences and a few other factors for additional services. The high number of indicators covered various aspects of about 80% of family practitioners’ clinical activity. A first-year assessment of the program revealed that family practitioners accomplished 98% of the available points for clinical indicators, much higher than the predicted 75%. Consequently, the incentive pay-outs actually made the program costlier than initially projected.

A few conclusions can be made from the early British experience, which are relevant to how P4P might affect dentistry:

1. Program acceptance is high if it is designed in close collaboration with the providers.
2. The reimbursement scheme should consider possible cost increases.
3. The impact of the financial incentive is larger when it represents a higher percentage of the practice income.
4. Program evaluation should be easy, which may require innovation.

In the British initiative, a major component of the program’s acceptance was the ability of physicians to exclude patients they did not feel were ideal candidates for any given performance

measure. Consequently, the evaluators could not determine the proportion of improvements that resulted from the exclusion of such patients and may have overestimated the program-related improvement. Thus, the program evaluation should include not only the program's quality indicators, but also other aspects of care not covered in the program, in order to see if they also were improved or worsened. Another cautionary lesson from the British experience is the possibility of unintended consequences. For example, an attempt to decrease waiting lists, one of the targets linked to P4P, resulted in having patients wait in ambulances until the official wait time in the Emergency Department was less than 4 hours (Gorman, 2009). P4P programs need appropriate refinements and balancing to ensure that the quality improvement objectives are achieved without while minimizing unintended consequences and cost.

Similar lessons were described by the early adopters of P4P in the US. A review by Rosenthal, Landon et al. (2007) demonstrated that P4P plans have had to change their performance measures over time, augment the financial incentives, and include risk adjustment in performance evaluation as means to address suboptimal success of these programs. The experiences described in the Rosenthal article also emphasized the need to promote providers' involvement in order to reduce their opposition to the program and the selection of clinical benchmarks rather than administrative performance measures. Most notably, the participating health plans could not demonstrate a favorable return on investment.

Of note to dentistry, P4P methodology proved to be extremely complex, hard to design, and difficult to implement (Bozic, Smith, & Mauerhan, 2007; Terris & Litaker, 2008) despite numerous evidence-based reports and outcomes indicators available in medicine. Dentistry lags in both areas. For example, the US Preventive Services Task Force sponsored by the Agency for Healthcare Research and Quality (AHRQ) submits evidence-based recommendations. Of the 114 posted recommendations, only 3 are evidence-related (AHRQ, 2009). On its website, the ADA makes clinical recommendations on only three areas (ADA, 2008). Of the 352 outcomes indicators recognized by the National Quality Measures Clearinghouse, only 3 are relevant to the practice of dentistry (AHRQ, 2008b). Without adequate measures and clinical recommendations, P4P cannot gain momentum in dentistry.

Moreover, many reviews in medicine were inconclusive regarding the link between P4P and quality of care (Campbell, Reeves, Kontopantelis, Sibbald, & Roland, 2009; Giuffrida, et al., 2000; Gosden, et al., 2001; Petersen, Woodard, Urech, Daw, & Sookanan, 2006). However, evaluation of P4P programs has not kept pace with their implementation. Despite weak and even contradictory evidence on the effectiveness of P4P, in recent years the debate about these programs shifted from ideology to implementation technicalities. The current P4P debate in medicine is not about "if" or "when" P4P programs will be implemented, but "how." Based on the ADA statement on P4P, the dental profession is still in the "when" stage.

Current experience with P4P in dentistry

Dental practice in the US is quite different from medical practice. For example, the number of solo general dental practitioners is significantly higher and the revenue sources are very different than those dominating the medical field (Table 1). One of the factors that encouraged the utilization of P4P in medicine was its origin in MCOs and other structured systems of care, such as large physician provider groups. These structures are not prevalent in dentistry. Provider revenue sources differ between dentistry and medicine and may influence P4P implementation as well. Insurance payments represent only 61.4% of dentists' revenues and 86% of physician income (ADA, 2006a; Karen E. Lasser 2008). Almost half of adults do not have any dental insurance (NIDCR/CDC, 2002). Public insurance for dental services is extremely limited and therefore, any policy change will not affect the practice of dentistry. In contrast, public financing plays an important role in medicine. CMS's programs are currently

targeted mostly at hospitals and large provider groups, not solo practitioners in outpatient settings. Relatively little dental care is provided outside the ambulatory setting (Table 1). These factors may significantly influence the adoption and structure of P4P in dentistry.

Nevertheless, a growing body of evidence demonstrates similarities in the care provided by dentists and physicians under various payment arrangements. A comparative study in California in the 1980's concluded that there was over-treatment in fee-for-service dental practices and under-treatment in capitated dental practices. The study also reported great variation in the distribution of services, with capitated practices providing less-expensive services (Atchison & Schoen, 1990). Other studies reported that under capitation, the provision of preventive dental services increased while the number of restorative services decreased (Blinkhorn, Hassall, Holloway, Mellor, & Worthington, 1996; Johansson, et al., 2007; Mellor, Blinkhorn, Hassall, Holloway, & Worthington, 1997). A more-recent British randomized controlled trial compared 3 provider interventions in dental practices: fee-for-service, education, and fee-for-service plus education, and found that the fee-for-service intervention was the most cost-effective at increasing the provision of targeted services by NHS dentists (Clarkson, et al., 2008). In the US, only a limited number of dental payers attempted to link dental reimbursements to performance. A description of some of these initiatives is presented below.

HealthPartners Dental Group

The HealthPartners Dental Group (HP), a 60 dentist practice in the greater Minneapolis, Minnesota area, initiated a P4P incentive program after implementing a caries risk assessment guideline in 1996. The guideline encouraged dentists and hygienists to identify and record various caries risk factors and use this information to assign a risk score of low, moderate or high. The risk score served as the basis for additional prevention recommendations, recall interval and other treatment planning issues.

Data obtained one year after implementing the guideline and internal audits showed that risk assessments were completed in only about 25-30% of new and recall examinations. These results prompted HP administration to implement in 1998 a payment incentive for dentists who completed risk assessments on 90% or more of examinations. This incentive was part of the variable individual component that comprised 20% of the dentist's total compensation. The variable individual component focused on areas that were under the control of the provider. Patients' satisfaction related to their experience also comprised a significant part of this incentive.

Results from the following year showed that the risk assessments were now being completed on 98% of patients, suggesting a remarkable success of the incentive program. The incentive was altered in 2002 to expand the focus on interventions for moderate- and high-risk individuals, which were not being implemented at the guideline-recommended rate. In 2004 this incentive was discontinued in order to focus the incentive dollars on other HP priorities. More recent reports on risk assessment and interventions show no reduction in the frequency of recorded risk assessments and preventive interventions, suggesting that P4P could be used to prompt the development and implementation of new, sustainable practices.

Kaiser Permanente Dental Care Program

The Kaiser Permanente Dental Care Program (KPDGP) provides service to about 180,000 members at 16 facilities in northwest Oregon and southwest Washington. Permanente Dental Associates, P.C., (PDA) is a for-profit professional corporation of about 120 dentists who provide services for members enrolled in the dental program. About 40% of PDA dentists' compensation is based on three levels of performance: program-wide, clinic, and individual

provider. Program-wide annual incentives payments are negotiated each year between PDA and KPDCP, and include organizational, service delivery, quality of care, and other employment-related goals. Incentive payments are also made based on meeting several clinic- and provider-level targets. Progress toward clinical targets is monitored regularly throughout the year.

One example is a recently introduced provider incentive targeted at tobacco cessation assistance. In 2004, a National Institutes of Health (NIH)-funded Implementing Tobacco Control in Dental Practice Trial studied the effectiveness and cost-effectiveness of a system-level tobacco control program within KPDCP using a matched clinic-randomization design (Little, Hollis, Fellows, Snyder, & Dickerson, 2009). In the intervention clinics, dentist-hygienist teams were trained to offer enhanced tobacco cessation counseling and encourage tobacco users to speak with a health education counselor via telephone from the clinic or arrange for a call back at home. Process measures indicated that the “assisted referral” intervention was effectively integrated into routine dental care, was well-accepted by providers, and led to increased patient satisfaction with tobacco cessation services (Little, et al., 2009). The randomized phase of the trial was completed in 2006, and the dental plan implemented the cessation program in control clinics in January 2007.

Data from the trial showed that intervention patients were more likely than controls (69% versus 3%, $p < .001$) to receive additional chair-side tobacco counseling and an assisted referral attempt. However, providers in control clinics achieved similar cessation assistance rates as intervention clinic providers after the program was fully implemented in the dental system. Beginning October 1, 2007, tobacco cessation counseling and assistance became part of the financial incentive package for PDA general dentists. The initial target rate for assisted referral attempts for adult members was 72% of identified smokers at new and annual recall visits at the clinic level. In 2008, the target was raised to 80%. At the end of 2008, administrative data showed that 98% of smokers received cessation counseling and an assisted referral attempt. While the incentive appears to be very successful, the 7.3% rate of smokers’ referral acceptance is similar to the rates achieved prior to the incentive. Thus, while the incented behavior increased substantially, one indicator of smokers’ behavior change (referral acceptance) has not been affected.

Delta Dental

Delta Dental, a commercial dental plan, has started 3 different performance-based programs. In Minnesota and Rhode Island, the plan implemented financial incentives for two process indicators, “total cost of the care provided” and electronic claim filing, respectively (Guay, 2007). Participating dentists in these plans were reimbursed more if they were considered “high performers” based on the first indicator or if they submitted claims electronically. The insurer also began a P4P program in Colorado, in which dentists are assessed by claims data whether they provide comprehensive, prevention-oriented and appropriate care by Delta standards and are rewarded accordingly. No reports on these programs are publicly available.

Department of Veterans Affairs (VA)

The VA recently started a quality improvement program for its dental services. Although it does not qualify as a P4P, the VA Office of Dentistry Quality Initiative warrants mention. The initiative is designed to increase the use of scientific evidence in the provision of oral health care. As a first step, the VA established a Quality Group that conducts systematic literature reviews and is in charge of developing information papers and evidence-based clinical indicators.

The first indicator developed by the Quality Group assesses the frequency of periodic comprehensive oral health examinations. The second indicator assesses fluoride-prescribing practices by VA dentists, and is accompanied by an information paper on the non-surgical management of dental caries with a focus on fluoride. Currently, these indicators are not tied to performance. However, because of how VA Dentist and Physician Pay Regulations are structured with base and special pay which could be linked to special contributions ("VA pay system mixes federal, physician-specific features," Atlantic Information Services, Inc., 2002) and the federal trend towards value-based purchasing, it should be possible to develop P4P programs in the VA dental care system.

Discussion

Little is known about the relationship between financial incentives, provider behavior, and quality of care in dentistry. To create a successful P4P program and one that is accepted by providers, policymakers need additional data from P4P research or adequate pilot programs. Mannion and Davis (2008) described the design elements of a P4P program: clear objectives, definable units of assessment, valid performance indicators, analysis and interpretation of performance data, performance standards and financial rewards. A P4P program with these elements cannot be easily designed in dentistry. Although dentists may be considered units of assessment and an adequate analysis of performance data could be carried out, the interpretation of data may not be straightforward due to limited available diagnostic and patient risk information. As the current experience with P4P in dentistry demonstrates, only limited objectives, performance indicators, and performance standards were tested until now. More studies on the link between financial rewards and performance improvement are needed.

Yet, based on evidence discussed above, we propose additional guidelines for the development of a P4P in dentistry.

To demonstrate the relationship between P4P and quality, such a program should focus on those areas of dentistry relevant to the majority of dentists. One example is restorative care, a very important part of the practice of dentistry. In a study conducted within the Dental Practice-Based Research Network (DPBRN) with 1101 dentists, 65% of participants reported that they spend more than 40% of their patient contact time on restorative dentistry (Makhija SK, 2009).

A proven way to gain provider acceptance is to design the P4P program in close collaboration between payers and providers (Spooner, et al., 2001). Clinicians will be interested in seeing the link between P4P and quality via clinical outcomes (Nicholson, et al., 2008). Therefore, it is preferable to include such indicators. Moreover, the program should target the dental areas that have an evidence base that supports specific treatments, or at least professionally-accepted clinical recommendations that have broad consensus. A major barrier to implementing P4P in dentistry at the present time is the dearth of strong evidence of the effectiveness of many areas of treatment, as well as the paucity of widely-accepted clinical guidelines.

Of 67 dentistry-related recommendations posted by the National Guideline Clearinghouse, 22 were developed by the American Academy of Pediatric Dentistry (AHRQ, 2008a). Since the only outcome indicators relevant to the daily practice of dentistry included in the National Quality Measures Clearinghouse are in pediatric dentistry and a few clinical guidelines relevant to restorative dentistry for children have been developed, one pilot program could attempt to demonstrate that P4P will result in better quality of care for dental caries in children. Caries prevention in children and adults could also be tested because the outcome is straight-forward (variation in number of tooth surfaces with carious lesions) and the ADA has issued clinical recommendations addressing this topic (2008).

Several other aspects must be considered in designing performance-based pilot programs for dental care. In medicine, P4P advocates did not wait for the results of rigorous research or the development of extensive evidence-based guidelines before experimenting with performance-based programs. However, these programs did not start with solo practitioners and did not mandate provider participation. Most P4P programs used in medicine today are voluntary and involve healthcare systems and large physician practices. These structures are not the predominant model of care in dentistry. A dental P4P program should measure performance at the dentist level, yet using structure, process, outcome and patient-based indicators to stimulate improvement in all aspects of care. For the pilot program to generate meaningful conclusions, special attention must be paid to choosing those measures under dentists' control and adjusting the results to patient risk. Moreover, performance goals would best be individualized to each dentist and expressed as percent change and predetermined targets for all dentists. This approach insures that the program rewards performance and potentially motivates dentists to further improve their patient care.

Several pilot programs will be needed to demonstrate the effectiveness of P4P in dentistry. The current enthusiasm for performance-based reimbursement and a demonstrated link between P4P and quality will give payers and policymakers the impetus to move forward with the implementation of P4P in dentistry. However, the biggest impediments for the acceptance of P4P by the dental profession remains the lack of agreement regarding quality in dental care, the scarcity of quality indicators, and the infancy of evidence-based dentistry.

Conclusion

P4P elicits professional interest, concern, and lively debates about its effectiveness. Nevertheless, P4P is gaining momentum in medicine. It is reasonable to expect that P4P will eventually be implemented in dental practice. Although several pilot programs could be tested at this time, widespread performance-based reimbursements in dentistry appear premature. Dental providers might accept P4P if they contribute to program design and see a link between P4P and quality. Unfortunately, at the present time quality in dental care is not clearly defined and is difficult to measure. Without measurement, performance improvement cannot be taken place. Absent a culture of quality measurement and improvement, development of more best practices, clinical practice guidelines, and evidence-based quality indicators, dentistry will continue to lag behind medicine in the adoption of P4P.

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Literature Cited

- American Dental Association. 2004 Survey of Dental Practice: Characteristics of Dental Practice and Their Patients. American Dental Association Survey Center; Chicago: 2006a.
- American Dental Association. 2004 Survey of Dental Practice: Income from the Private Practice of Dentistry. Chicago: 2006b.
- American Dental Association. A-Z advocacy issues, letters and testimony. [Retrieved June 8, 2009]. 2006c from <http://www.ada.org/prof/advocacy/issues/performance.asp>
- American Dental Association. Evidence-Based Dentistry. [Retrieved December 5, 2008]. 2008 from <http://www.ada.org/prof/resources/ebd/index.asp>

- Agency for Healthcare Research and Quality. National Guideline Clearinghouse™ (NGC). [Retrieved November 26, 2008]. 2008a from <http://www.guideline.gov/browse/browsecondition.aspx>
- Agency for Healthcare Research and Quality. National Quality Measures Clearinghouse™ (NQM). [Retrieved November 24, 2008]. 2008b from <http://www.qualitymeasures.ahrq.gov>
- Agency for Healthcare Research and Quality. U.S. Preventive Services Task Force. [Retrieved June 8, 2009]. 2009 from <http://www.ahrq.gov/clinic/uspstfix.htm>
- American Medical Association. Center for Health Policy Report. , editor. The Practice Arrangements of Patient Care Physicians, 2001. Physician Marketplace Report. 2004. Available from <http://www.ama-assn.org/ama1/pub/upload/mm/363/pmr-022004.pdf>
- American Medical Association. AMA Trustees adopt pay for performance principles. Qual Lett Healthc Lead 2005;17(8):15–16. [PubMed: 16304882]
- American Medical Association. Physician Characteristics and Distribution in the US. AMA Press; Chicago: 2008a. (No. ISBN#: 978-1-57947-897-1)
- American Medical Association. Physicians in the United States and possessions by selected characteristics. 2008b. Available from <http://www.ama-assn.org/ama/pub/category/2676.html>
- American Medical Association. Patient Care Physician Survey. 2001.
- Arias KM. Mandatory reporting and pay for performance: health care infections in the limelight. AORN Journal 2008;87(4):750. [PubMed: 18395020]
- Atchison KA, Schoen MH. A comparison of quality in a dual-choice dental plan: capitation versus fee-for-service. J Public Health Dent 1990;50(3):186–193. [PubMed: 2342032]
- Blinkhorn AS, Hassall DC, Holloway PJ, Mellor AC, Worthington HV. An assessment of capitation in the new General Dental Service contract. Community Dent Health 1996;13(Suppl 1):3–20. [PubMed: 8689497]
- Boeree, CG. B. F. SKINNER - Autobiography. [Retrieved June 8, 2009]. 1998 2006 from <http://webspace.ship.edu/cgboer/skinner.html>
- Bozic KJ, Smith AR, Mauerhan DR. Pay-for-performance in orthopedics: implications for clinical practice. J Arthroplasty 2007;22(6 Suppl 2):8–12. [PubMed: 17823006]
- Campbell SM, Reeves D, Kontopantelis E, Sibbald B, Roland M. Effects of pay for performance on the quality of primary care in England. N Engl J Med 2009;361(4):368–378. [PubMed: 19625717]
- Clarkson JE, Turner S, Grimshaw JM, Ramsay CR, Johnston M, Scott A, et al. Changing clinicians' behavior: a randomized controlled trial of fees and education. J Dent Res 2008;87(7):640–644. [PubMed: 18573983]
- Centers for Medicare & Medicaid Services. Medicare program; changes to the hospital inpatient prospective payment systems and fiscal year 2008 rates. Final rule 42 CFR §411.412,413,489. [Retrieved August 29, 2009]. 2008 from <http://edocket.access.gpo.gov/2008/pdf/E8-17914.pdf>
- Epstein AM, Lee TH, Hamel MB. Paying physicians for high-quality care. N Engl J Med 2004;350(4):406–410. [PubMed: 14736934]
- Ferman JH. Pay for performance: obstacles/implications. Despite challenges, pay-for-performance programs are here to stay. Healthc Exec 2004;19(6):44, 46. [PubMed: 15552829]
- The Kaiser Family Foundation. Urban Institute and Kaiser Commission on Medicaid and the Uninsured Estimates based on the Census Bureau's March 2007 and 2008. Current Population Survey (CPS: Annual Social and Economic Supplements). [Retrieved November 25, 2008]. 2008 from <http://www.statehealthfacts.org/profileind.jsp?ind=125&cat=3&rgn=1>
- Giuffrida A, Gosden T, Forland F, Kristiansen IS, Sergison M, Leese B, et al. Target payments in primary care: effects on professional practice and health care outcomes. Cochrane Database Syst Rev. 2000; (3) CD000531.
- Gorman, Linda. NHS Update. Pay for Performance. 2009. Retrieved from <http://www.john-goodman-blog.com/pay-for-performance/>
- Gosden T, Forland F, Kristiansen IS, Sutton M, Leese B, Giuffrida A, et al. Impact of payment method on behaviour of primary care physicians: a systematic review. J Health Serv Res Policy 2001;6(1):44–55. [PubMed: 11219360]
- Guay, Albert H. Understanding pay for performance. [Retrieved 11/07/2008]. 2007 from <http://www.ada.org/prof/resources/pubs/asanewsarticle.aso?articleid=2344>

- JCAHO, Joint Commission on Accreditation of Healthcare Organizations. Joint Commission establishes national principles to guide pay-for-performance programs. *Jt Comm Perspect* 2005;25(1):8–9.
- Johansson V, Axtelius B, Soderfeldt B, Sampogna F, Lannerud M, Sondell K. Financial systems' impact on dental care; a review of fee-for-service and capitation systems. *Community Dent Health* 2007;24(1):12–20. [PubMed: 17405465]
- Lasser, KE.; Woolhandler, S.; Himmelstein, DU. Sources of U.S. Physician Income: The Contribution of Government Payments to the Specialist–Generalist Income Gap. 2008.
- Little SJ, Hollis JF, Fellows JL, Snyder JJ, Dickerson JF. Implementing a Tobacco Assisted Referral Program in Dental Practices. *J Public Health Dent*. 2009
- Makhija SK, Gilbert GH, Rindal DB, Benjamin PL, Richman JS, Pihlstrom DJ, Qvist V, for the DPBRN Collaborative Group. Dentists in practice-based research networks have much in common with dentists at large: evidence from The Dental PBRN. *General Dentistry* 2009;5(3):270–275. [PubMed: 19819818]
- Mannion R, Davies HT. Payment for performance in health care. *Bmj* 2008;336(7639):306–308. [PubMed: 18258966]
- Mellor AC, Blinkhorn AS, Hassall DC, Holloway PJ, Worthington HV. An assessment of capitation in the General Dental Service contract 2. Patterns of treatment provided to regularly attending patients. *Br Dent J* 1997;182(12):460–464. [PubMed: 9231519]
- Nicholson S, Pauly MV, Wu AY, Murray JF, Teutsch SM, Berger ML. Getting real performance out of pay-for-performance. *Milbank Q* 2008;86(3):435–457. [PubMed: 18798885]
- NIDCR/CDC. Oral Health, U.S. 2002 Annual Report. 2002.
- Petersen LA, Woodard LD, Urech T, Daw C, Sookanan S. Does pay-for-performance improve the quality of health care? *Ann Intern Med* 2006;145(4):265–272. [PubMed: 16908917]
- Rosenthal MB, Landon BE, Howitt K, Song HR, Epstein AM. Climbing up the pay-for-performance learning curve: where are the early adopters now? *Health Aff (Millwood)* 2007;26(6):1674–1682. [PubMed: 17978386]
- Shekelle P. New contract for general practitioners. *Bmj* 2003;326(7387):457–458. [PubMed: 12609914]
- Spooner A, Chapple A, Roland M. What makes British general practitioners take part in a quality improvement scheme? *J Health Serv Res Policy* 2001;6(3):145–150. [PubMed: 11467271]
- Steiger B. Poll finds physicians very wary of pay-for-performance programs. *Physician Exec* 2005;31(6):6–11. [PubMed: 16382644]
- Terris DD, Litaker DG. Data quality bias: an underrecognized source of misclassification in pay-for-performance reporting? *Qual Manag Health Care* 2008;17(1):19–26. [PubMed: 18204374]
- VA pay system mixes federal, physician-specific features. *Physician Compensation Report*. [Retrieved March 5, 2009]. from http://findarticles.com/p/articles/mi_m0FBW/is_12_3/ai_95320432

Table 1

Comparison of U.S. dentists and physicians and their revenue (ADA, 2006a,2006b; AMA, 2004,2008a,2008b, 2001;The Kaiser Family Foundation, 2008;Karen E. Lasser 2008)

Characteristics	% U.S. dentists	% US physicians
Type of practice		
Generalist	81.3	34
Specialist	18.7	66
# patient visits/week	60.5	98.4
Type of practice		
Solo practitioner	65	23.7
Group practice	26.2	48
Employee	6.2	22.3
Other	2.7	6
Insurance coverage by patients in practice *		
Covered by a private insurance program	64	58
Covered by a public program	5.7	26
Uninsured	30.3	15
Revenue by source		
Government programs	4.7	31.2
Private indemnity insurance	56.7	54.8
Out-of pocket	37.4	14
Other sources	1.8	0

* Dental insurance tends to be less comprehensive than medical insurance.