

Carl F Loeb

## PreViser – an online periodontal risk calculator: what does this offer to oral health stakeholders from a business perspective?



**Carl F Loeb**  
Chief Executive Officer,  
PreViser Corporation  
Email: carlf@viser.com

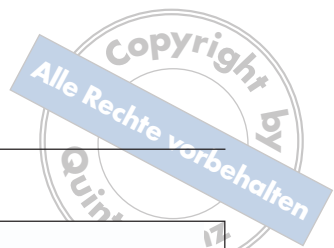
**KEY WORDS** *PreViser, risk calculator*

A clinically validated, computer-based tool for the calculation of periodontal disease risk has become commercially available. In addition to risk analysis, the tool provides the general dentist, periodontist or orthodontist with an individualised description of disease severity and extent, rendered textually and as a numeric score in easy to understand clinical and patient reports. The tool utilises less data than collected during a standard periodontal examination, is easy and inexpensive to use, and the reports generated by the system are well received by patients. Evidence-based therapeutic recommendations are offered to the clinician for consideration in treatment planning, determined by current or changing risk and severity scoring. The widespread use of the tool has broad implications for stakeholders in oral health care. This commentary examines the reported effects of the use of the system, and conjectures on possible future effects resulting from system usage.

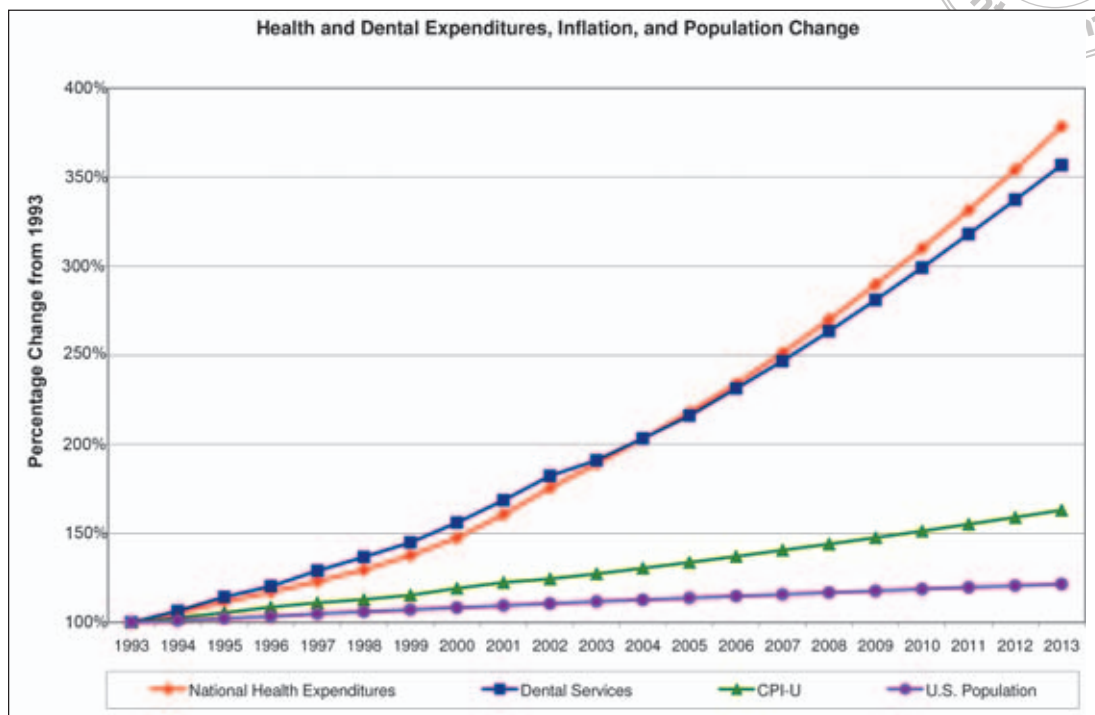
### ■ Introduction

In 1995, a group of specialist practice-based periodontists in the United States began to develop a practical methodology for the calculation of periodontal disease risk. The intention of the group was to develop a tool that would assist general dentists in identifying those patients at risk of periodontal deterioration and might therefore be candidates for early referral for specialist care.

A computer-based algorithm was developed and incorporated into a web-based risk calculator, which was subsequently validated clinically<sup>1,2</sup>. In 2003, the system was patented<sup>3</sup>, commercialised and offered to US dentists as the Oral Health Information Suite™ (OHIS). In 2006, an enhancement to the system was made the subject of a patent application in the EU, Japan, Canada and US. It has been made available as a free download from an Internet web site ([www.previser.com](http://www.previser.com)), with modest fees charged for



**Fig 1** Percentage growth in expenditures for health care (red diamonds) and dental services (blue squares) plotted against increases in the US Consumer Price Index for all Urban Consumers (green triangles) and the US population (purple circles) (baseline 1993)<sup>8,9</sup>.



usage. Dentists in over 26 countries are using the technology, with PreViser licences issued in Japan and Israel, and licenses under development in the UK and India. Currently, the system offers assessment for periodontal disease risk on a scale from 1 (very low) to 5 (very high), as well as a periodontal disease score that serves as a numeric description of disease severity and extent on a scale from 1 (health) to 100 (severe generalised disease). Based on these objectively derived scores, possible therapeutic interventions are suggested for consideration in treatment planning, listed in evidence-based, stacked rank order, from treatments 'generally most effective' to 'less likely to be effective' in reducing disease severity. The system is designed to function as an artificial intelligence entity, learning from which interventions are most effective in reducing risk and disease severity, and periodically modifying its treatment recommendations based on these objective results.

Internationally, health care costs are rising. Aging populations and advancing technology are all contributors to what has been an inexorable increase in the costs of health care. These increases threaten economic prosperity and equality of access to care, and are projected to continue to grow at unsustainable rates (Fig 1). There is a growing belief that most

of the cost savings available from managed health care initiatives have been realised, and that if the system is to avoid functional meltdown, information derived from technological innovation that focuses and streamlines the delivery of care is an essential element to guaranteeing the continued delivery of high-quality care to those who need it<sup>4,5</sup>.

**How the technology is used**

Clinicians download the application from the Internet, and the program is installed (at no cost) on the clinician's computer. Assessments for periodontal disease risk and severity, as well as oral cancer risk and caries risk can then be performed. Periodontal assessments require no more than 23 data points recorded on the computer that describe clinical observations for the patient being assessed. This information is sent via an Internet connection to PreViser, and the information needed to print reports from the clinician's computer are returned via the Internet. Total turnaround time, including recording the requisite data into the PreViser application, sending the data to PreViser via the Internet, and the return of the information required to begin printing the reports av-



erages less than 3 minutes. A single charge for a new patient is levied for unlimited assessments each 12-month period. All information meets required privacy requirements worldwide, as no human identifiers are sent with the clinical information to PreViser. The only location where the identity of the patient is known is within the clinic-based computer system.

## ■ Implications

There are broad implications for the widespread adoption of the PreViser system within dentistry. The objective risk and disease scores provide a means to measure outcomes of care, which can be used to improve the quality and cost of care by encouraging the interventions objectively shown to improve health or prevent disease most effectively.

With the wide variability in methods and approaches to the measurement and description of periodontal disease discussed by Dr Page and Dr Martin elsewhere in this issue, and recognising that great progress has been made in many areas, dentistry still has not been able to maximise the quality of care it could provide to patients. The fundamental starting point for all modern systems of quality improvement is the constant and objective measurement of outcomes, and the adjustment of the processes that lead to those outcomes. While human biology presents unique challenges to such measurements, the lack of objective measurement within dentistry is an unnecessary antagonist to improvement. Given the financial and health stakes involved, the problem of matching care to the objectively determined needs of patients will inevitably be solved. Information technology such as that offered by PreViser will be an integral component of that solution.

## ■ Impacts on third party payers

The lack of objective outcome measurements and quantitative systems for determining needs in dentistry has led to some unusual effects in the marketplace, which do not appear to serve the needs of patients. Without the ability to determine need objectively, insurance companies have developed (at least in the United States), 'one size fits all' insurance poli-

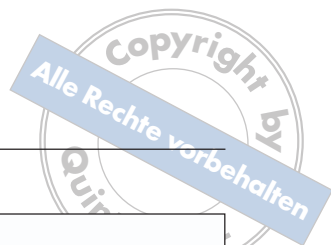
cies, which presume that all covered individuals have precisely the same healthcare needs: therefore all individuals within a given group receive the same annually capped benefit allowances. This system inevitably results in some patients qualifying for more benefits than they require, while others are denied the level of care they need. Further, incentives for dentists are skewed towards payments for repair-based interventions rather than those that employ a preventative approach, because the success of preventative strategies is impossible to measure in the short-term. By definition, the benefits from preventative strategies arise in the future from reduced costs associated with active interventions. As a result, dentistry can be fairly characterised as a reactive, reparative endeavour rather than one focused on predictive and preventive interventions.

Objective scoring using systems like PreViser makes it possible to create new designs of insurance benefit plans that will allow patients to receive all of the care needed to restore and maintain health<sup>6</sup>. For example, consider a risk and disease severity comparison of two groups of individuals; one the employees of a fast growing software company where the average age is 32, and another group composed of the employees of a steel mill, with an average age of 47 (Table 1).

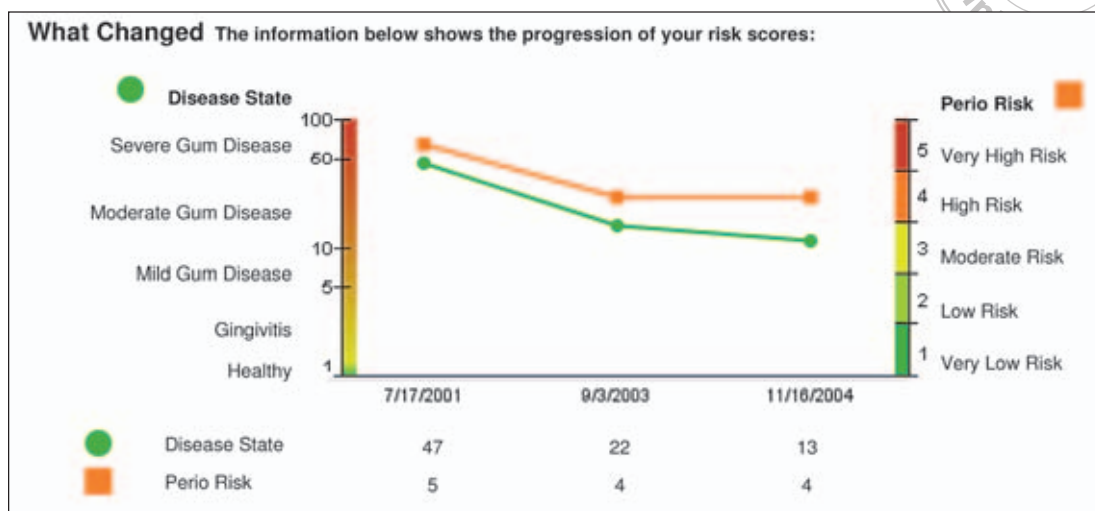
Regardless of the population size of these groups, accurate estimates of the cost of care for dealing with current periodontal status, as well as accurate predictions of probable future costs of care can be determined. Differential pricing can be arrived at, ensuring optimum care for both groups at the best possible price. Fortunately, it appears from research published in Sweden that targeting care to need as in the above example is in fact cheaper than the current model of providing essentially equivalent levels of benefit to all covered lives<sup>7</sup>. Using the same data, governmental payers of care can much more effectively target limited public resources to those popu-

**Table 1** Example of PreViser scores.

	Average PreViser scores	
	Perio risk	Perio severity
Computer employees	2.3	15.3
Mill employees	3.1	22.7



**Fig 2** Change in Pre-Viser calculated risk and periodontal disease score over time (source PreViser OHIS™ patient report).



lation segments in greatest need of care, based on objective health scores.

New compensation paradigms are made possible with accurate outcome measurements, where dentists could be rewarded for their ability to keep patients healthy, and to deliver appropriate reparative interventions most effectively. By creating an accurate and objective means of measuring disease severity, disease risk, and the effectiveness of therapeutic interventions, the adoption of PreViser-like technology has the potential to change fundamentally how third party payers allocate their health care benefit resources.

**Impacts on clinicians**

PreViser recommends that all patients be assessed each time they are seen for the same reason a physician takes a blood pressure reading on each patient, whether marathon runner or pensioner. The Pre-Viser scores create a baseline measurement of risk and disease against which future interventions can be more effectively planned and measured. Providers using the system in this manner are beginning to report various, and in some cases, unexpected beneficial effects. Patients exposed to the individualised reports appear to develop a fuller understanding of their oral health, how it is improving or worsening, and armed with this information, are more likely to participate actively in the management of their own oral health. This result is intuitive when one consid-

ers how the following two statements might be processed by a patient:

- 'I have good news. A year ago you had generalised moderate and localised severe periodontitis and today you have generalised mild and localised moderate to severe periodontitis. Keep up the good work!'
- I have good news. Your health score has improved from 45 to 32. Well done!'

In both cases the patient probably smiles and nods, but the advantage of the second statement is that it is likely the patient actually understands what was said. Such understanding appears to increase compliance and loyalty, with probable impacts on practice loyalty.

In the case of periodontitis, the combination of a numerical risk and disease severity score allows the dentist quickly to communicate complex information to the patient in a visual and easily interpretable manner (Fig 2). Where the services of a hygienist are utilised, the communication between hygienist and dentist is significantly enhanced, resulting in time savings on the part of the dentist. If the scores are improving, deteriorating or remaining the same, the appropriate involvement from the dentist is indicated, and in many cases, that involvement is reduced. In other words, the use of the system results in a productivity increase by more effectively using the skill sets of all clinicians within the practice.

Whilst the evidence base is still growing, the linkage between periodontitis and other systemic disease

**Table 2** A PreViser-generated Practice Analysis Report for a rural Minnesota general dentist practice (actual data).**Executive Summary**

Based on the data you provided, your total adult patient population >29 years of 1,000 patients are projected to exhibit the following combinations of risk and disease severity:

Score range		Current disease score				Total of risk category		% of risk category	
		1-3	4-10	11-36	37-100				
Severity category		Health – gingivitis	Mild periodontitis	Moderate periodontitis	Severe periodontitis				
Current risk score	1,2	287	284	69	0	640	64%		
	3	26	106	19	22	173	17%		
	4,5	0	17	84	86	187	19%		
Total of disease category		313	407	172	108				
% of disease category		31%	41%	17%	11%				

Patients sample size used to prepare this report: 50  
 The mean of all PreViser Risk Scores is: 2.45  
 The mean of all PreViser Disease Scores is: 16.03

From this distribution of disease risk and severity, we can estimate that your patients will require the following care over the next twelve months to optimise their periodontal health:

Quadrants of scaling and root planing: 709  
 Prophylactic appointments: 244  
 Surgical procedures, assumed to be performed by specialist: 180  
 Periodontal maintenance appointments: 1,584  
 Patients who may be considered for referral to a periodontist: 127

Full-time equivalent hygienists required for adult preventive care: 1.58  
 Full-time equivalent hygienists required for scaling and root planing: 0.63

Projected hours of review and management by dentist(s): 208

processes points the way towards the potential for medico-legal liability for dentists who fail to diagnose and treat periodontitis. The use of systems like PreViser appears to largely insulate the dentist from such risk, and the discussion of the assessment results with the patients is regarded as an important step in informed consent for treatment, or the denial of the same.

Recently, PreViser Corporation has begun to offer to its subscribers what it terms a 'Practice Analysis Report' (Table 2). This report projects the risk and disease distribution of the first 50 patients in a prac-

tice onto the entire adult patient population and provides analysis on the total number of procedures required to provide optimum care for patients, as well as suggesting the number of full time hygienists who might be required to deliver such care where hygienists are utilised. In essence, this report informs the dentist about just how much disease exists amongst his/her patients, what time and staffing is required to provide such care, and based on practice reported rates of reimbursement, what the economic impacts on the practice would be of delivering this care.



## ■ Summary

PreViser analytics are designed to provide consistency, objectivity and reproducibility in the quantification of oral disease risk and periodontal disease severity. The use of the information in clinical practice appears to result in significant productivity benefits to the practice, greater understanding and satisfaction among patients, and points the way towards a possible future for dentistry that anticipates rather than reacts to disease, and that bases clinical judgments on information that is always current with best practices, and tailored for individual needs.

## ■ References

1. Page RC, Krall EA, Martin J, Mancl L, Garcia RI. Validity and accuracy of a risk calculator in predicting periodontal disease. *J Am Dent Assoc* 2002;133:569–576.
2. Page RC, Martin J, Krall EA, Mancl L, Garcia R. Longitudinal validation of a risk calculator for periodontal disease. *J Clin Periodontol* 2003; 30:819–827.
3. U.S. Patent #6,484,144.
4. Enthoven AC, Vorhaus CB. A vision of quality in health care delivery. *Health Aff* 1997;16:44–57.
5. Reinhardt U. Harness information to make health care work. *Manag Care* 2002;11:28.
6. Porter ME, Teisberg EO. Redefining competition in health care. *Harv Bus Rev* 2004;82:64–76.
7. Axelsson P. Diagnosis and risk prediction of periodontal diseases. Chicago: Quintessence 2002:287
8. Center for Medicare and Medicaid Services, <http://www.webcitation.org/query?id=1141658230964851>. Accessed March 6, 2006.
9. U.S Department of Labor, Bureau of Labor Statistics, <http://www.webcitation.org/query?id=1141658676449988>. Accessed March 6, 2006.