

# The dawn of personalised preventive dentistry



In 2015, former U.S. President Barak Obama launched a precision-medicine initiative which inspired the development of several measures targeting the improvement of health care on a personal level for everyone.<sup>1</sup> Following the spirit of this initiative, future evidence-based approaches to both prevention and treatment of non-communicable diseases, such as cancer or diabetes mellitus, may be initiated sooner, tailored more individually, and concluded earlier. Consequently, such measures are expected to facilitate health care and reduce its financial burden when being specifically chosen for (precision medicine) and individually-tailored to (personalised medicine) each patient personally.<sup>2,3</sup>

While common primary and secondary prevention in dentistry have shown successful outcomes over the past few decades, new technologies have surfaced which allow the application of algorithm-based decision-making tools in general dental practice. Recently, the implementation of an algorithm to determine individual intervals for supportive periodontal therapy (tertiary prevention) was suggested, aiming at the improvement and stabilisation of periodontal conditions over longer periods of maintenance care.<sup>4</sup> Further evidence demonstrated that individually-tailored communication with the periodontal patient was shown to increase motivation as well as self-efficacy for the improvement of preventive measures, such as daily oral hygiene and a healthy diet.<sup>5-7</sup> Therefore, professional use of these interventions for the promotion of healthy lifestyles in dental practice and implementation of communication curricula in the undergraduate education of dental students and dental hygienists have been promoted and investigated further.

While future dental professionals will be trained in using new algorithm-based tools and educated in patient communication, the general population will still need to receive additional detailed information on the nature of oral diseases and their cure. Delivering this information or providing behavioural support in dental practice, however, is time consuming and often lacks financial compensation; these challenges lead to the assumption that health professionals cannot afford these measures. Since the financial value of preventive measures provided in dental practice is underestimated by both patients and health care providers, the significance of this specific value must be emphasised. Notably, the financial benefit of such preventive measures needs to be demonstrated to the general population, eg, by using new information technology. Web-based tools could enable patients to compare algorithm-based assessments of potential health costs and their own health-related data with others using these tools. Similarly, further parameters such as quality of life or life expectancy could be compared using such

applications. Simply by comparing their overall health parameters, including health costs, with those of either the healthiest or the average members of a population may increase their understanding of the specific value of all preventive measures, possibly leading to the improvement of their own performance.

Both primary and secondary preventive dentistry for the general population are well established. They demonstrate a long history of success in dental practice. The advent of precision medicine, however, may signal the dawn of new, personalised, tertiary preventive measures in dentistry, for instance, using algorithm-based applications and communication techniques for the promotion of healthy lifestyles. These personalised measures will require ongoing scientific evaluation, but they may lead to both improved patient health and a reduction of health care costs, possibly even due to personalised prevention of overtreatment (quarternary prevention). Consequently, a continuous interdisciplinary collaboration of researchers, clinicians, law and policy makers needs to be established to improve future personalised preventive dentistry and each patient's quality of life.

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