International Journal of Research and Reports in Dentistry

Volume 9, Issue 1, Page 48-55, 2026; Article no.IJRRD.150183

Innovating Quality Evaluation in Swedish Dental Care: Development and Testing of a New Assessment Method

Marianne Forsell [a*], Urban Fagerholm [b] and Lars Svärd [c++]

[a] *Dentalum Operations, Stockholm, Sweden.*
[b] *Prosilico AB, Huddinge, Sweden.*
[c] *Visthusgatan 127, 72481 Västerås, Sweden.*

Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

Article Information

DOI: https://doi.org/10.9734/ijrrd/2026/v9i1275

Open Peer Review History:
This journal follows the Advanced Open Peer Review policy. Identity of the Reviewers, Editor(s) and additional Reviewers, peer review comments, different versions of the manuscript, comments of the editors, etc are available here: https://pr.sdiarticle5.com/review-history/150183

Original Research Article

Received: 18/10/2025
Published: 13/01/2026

Abstract

Objectives: Swedish dentistry is covered by a strict set of regulations via laws, constitutions and regulations. There is a need for further improvements in the area. We decided to start a framework for quality development based on the treatment patients have received. The objectives of this pilot study were to a) develop a questionnaire for evaluation of the documentation and dental care in Swedish dentistry, b) use this questionnaire to evaluate the documentation and dental care by dentists in our organization (Dentalum AB), and c) develop, validate and evaluate a short questionnaire version.
Methods: An external expert in odontology and dental care developed a 98-item questionnaire about documentation/record keeping and patient care according to science and proven experience

[++] *Independent Assessor;*
**Corresponding author: Email: marianne.forsell@dentalum.com;*

Cite as: *Forsell, Marianne, Urban Fagerholm, and Lars Svärd. 2026. "Innovating Quality Evaluation in Swedish Dental Care: Development and Testing of a New Assessment Method". International Journal of Research and Reports in Dentistry 9 (1):48-55. https://doi.org/10.9734/ijrrd/2026/v9i1275.*

(named T98). 136 patient records from 22 of our clinics and 65 dentists were analyzed. The expert also proposed a short version questionnaire with 18 essential questions around patient safety (T18). Degree of fulfilled and unfulfilled efforts/measures was calculated for individual issues, subject areas and overall areas.

Results: The average patient reached ca 70 and ca 30 % degrees of fulfilled and non-fulfilled efforts/measures, respectively. Low levels of fulfilment were found for some efforts/measures (6-31 %) and dentists (7 % with <50 %). This shows moderate overall and low individual compliance rates, underserved areas and development potential and needs. In 7 % of the cases, 90-100 % fulfilment was reached, which shows that top quality is reachable. Findings demonstrate that T18 can be used for more rapid and convenient evaluations without losing important information.

Conclusion: In this single-organization pilot study with assessments performed by one expert reviewer, we reached the primary objectives. T18 was found to be useful for faster and more convenient evaluations without losing essential information. We have created a basis for discussion about dental education, competence and competence assurance. Ultimately this is considered to strengthen skills and benefit patients.

Keywords: Dental care; oral health; questionnaire; quality assessment; quality assurance; competence development.

1. Introduction

Dental care in Sweden has been regulated for many years via laws, constitutions and regulations. A number of activities take place daily at serious healthcare providers to promote the development of dental quality. Quality responsible dentists and quality managers are employed and their main task is to ensure that the dental care informed to patients is of high quality and patient safe. Over the years, countless quality management systems and routines have been created, and processes have been documented and revised. Countless courses have focused on the PDCA (Plan, Do, Check, Act) wheel and many have done missions within their organizations and benchmarked between organizations. Various events have focused on quality in odontology and dental care, including Dental Society (Swedish Tandläkarsällskapet) courses at the annual National Assembly for Odontology (Riksstämman). Many have aimed to show how they work to improve the quality of dental care. Unfortunately, very few, if any, have attempted to gain knowledge about what the quality of dental care that the patient receives really looks like, whether licensed dentists have followed the processes, guidelines and routines that the care providers documented in their management systems, and whether reported dental care has been performed in accordance with science and proven experience and properly documented in accordance with applicable laws. In order to acquire that knowledge, it is required that patient journals are scientifically evaluated using standardized and valid questionnaires by professionals experienced in odontology, dental care and reviewing patient records (von Bültzingslöwen et al., 2019; Persson Kylén et al., 2025; Rolander et al., 2013).

The term "*science and proven experience*" has long been used in educational institutions as well as in law, and it is also an essential part of dental care and odontology. It is, for example, found in texts of the Patient Safety Act (Patient Safety Act. *2010:659*) as well as in the Ordinance on state dental support (*Förordning om statligt tandvårdsstöd 2008:193*).These state, for example, that *"Dental care measures that have obviously been carried out in violation of science and proven experience and that have resulted in a care injury or risk of such injury are not eligible for compensation"* (§ 3 in the Patient Safety Act) and dental staff must perform their work in accordance with science and proven experience (Chapter 6, § 1 in the Patient Safety Act). According to Chapter 3 in the Patient Data Act (Patientdatalag *2008:355*) patient records must contain the information needed for good and safe care of the patient. Focus on quality, safety, and transparency in dentistry is also provided by the European Regional Organization (European Regional Organization, 2016; Socialstyrelsen, 2025).

In 2017, the Swedish Health and Social Care Inspectorate (Inspektionen för Vård och Omsorg; IVO) reviewed 51 small private dental care providers (Inspektionen för vård och omsorg [IVO], 2017). They found that the majority of these lacked knowledge of what responsibility they had as caregivers. Many lacked systematic

work with patient safety and quality. In several cases there were also significant deficiencies in patient care. Due to insufficient self-control, caregivers did not discover these deficiencies themselves. All caregivers except one have received decisions where IVO set demands for measures. In some cases, IVO has also initiated an investigation of the professional practice of individual dentists. IVO took a serious view of the shortcomings which emerged.

Dentists working in Sweden have either education and degree from any (or more) of the four national dental schools or/and from international dental schools. The responsibility of educational sites is to adequately provide dental students with the best conditions to become skillful dentists, and this includes education in scientific methodology, documentation, laws, responsibilities and regulations. It is the responsibility of dentists to work and act according to the established principles, be updated and maintain the required quality standards. Principles, guidelines and quality assessments at dental clinics can assure that this is fulfilled.

The primary objectives of this pilot study were to a) develop a questionnaire for evaluation of the documentation and dental care in Swedish dentistry, b) use this questionnaire to evaluate the documentation and dental care (assess and review whether laws, regulations and rules and the scientific mindset and method have been applied) by dentists in our dental organization Dentalum AB (with a total of 30 clinics), and c) develop, validate and evaluate a short version of the questionnaire. The secondary objectives were to a) create a basis for organizational (within Dentalum AB), local (in Swedish dentistry), educational (e.g. among the four Swedish dental schools) and global discussion about dental education and competence, b) create a basis for employers/care providers to ensure the competence of employed dentists, c) provide the National Board of Health and Welfare with the basis for developing and securing the competence of third-country dentists (dentists from outside the EU) before they receive authorization (legitimation) to practice the dental profession in Sweden, and d) provide Swedish authorities, primarily the Social Insurance Agency (Försäkringskassan) and the Health and Care Inspectorate (IVO) a basis for developing and ensuring that tax funds and personnel resources are used as efficiently as possible.

2. Methods

An externally summoned expert in odontology and dental care with extensive experience in the field and in quality work developed a questionnaire (record review form) with 98 questions about documentation/record keeping and patient care according to science and proven experience (named T98).

The subject areas that underwent structured review by this individual included patient needs, examinations and examination documentation, diagnostics and diagnostic documentation, referral procedures, and therapy plans, and what is considered most urgent within the various odontological subject areas, including radiology, periodontology, cariology, endodontics, prosthetics, surgery, implant surgery, bite physiology and drug treatment (see Table 1).

136 patient records from 22 clinics and 65 dentists (on average 2.1 patients per dentist) at Dentalum AB were analysed/reviewed. Patient identities and information were not known and not used in this evaluation. Focus was on evaluating the dentist work. Neither were dentist identities used in the evaluation.

Main questions and evaluations for each area are shown in Table 1. Each area was reviewed by the external expert based on whether the documentation was adequate to be said to meet today's legal requirements and quality/scientific standards.

The external expert in odontology and dental care (a former supervision dentist at IVO with more than 5,000-8,000 hours of experience reviewing dentists' work in at least 1,000 dental records) also proposed a short version questionnaire with 18 major/essential questions about documentation/record keeping and patient care according to science and proven experience (named T18; see selected questions in Table 1).

Findings from the evaluation were categorized as follows: Fulfilled efforts/measures, Not fulfilled efforts/measures and Questionable. Only results from completed treatments were selected for the evaluation. Findings were analyzed and compared statistically. Degree of fulfilled and unfulfilled efforts/measures was calculated for individual issues, subject areas and overall areas.

Table 1. Areas and questions in the T98 questionnaire. Selected T18-items are marketed with an asterix (*)

Domain	
X-ray	Whether adequate X-rays were taken in connection with examination, treatment and evaluation*. Have these images been adequately justified* and is there documentation of what the captured images show/do not show. In addition, an assessment of the technical quality of the X-ray images was done and whether the radiation safety was good.
Cariology	Whether the patient has been diagnosed correctly*. Furthermore, if adequate investigations have been carried out to obtain information on cariological risk factors. Has the patient received adequate disease information? Has the cariological disease been treated* and have measures taken been evaluated to ensure that the disease is under control before other prosthetic/surgical measures are planned?
Periodontology	Whether the patient has been adequately diagnosed to ensure that information has been obtained to be able to assess the patient's periodontal status*. Has the patient received adequate disease information, instructions to deal with the periodontal disease? Has the periodontal disease been treated adequately* and have measures taken been evaluated to ensure that they had the desired effect?
Endodontics	Whether root canal-treated teeth have been diagnosed correctly* and if the endodontic treatment has been carried out in a patient-safe manner. Furthermore, the technical quality of the root fillings* is examined in relation to proximity to the radiographic apex and the density of the root filling.
Prosthetics	Whether the patient's previous causal oral disease was treated and evaluated and found to be under control before the prosthetic treatments were commenced*. An assessment was done as to whether the performed prosthetic treatment was carried out in a patient-safe manner*.
Dento-alveolar surgery	Whether the surgical procedures were carried out in a patient-safe manner. Has adequate information been obtained to ensure that the procedures do not mean any harm to the patient's health?
Implant surgery	Whether performed implant surgical measures have focused on a careful preoperative assessment to ensure that a surgical intervention with minimal risk of complications for the patient is performed*. Furthermore, that the surgical installation of implant fixtures has been done in an adequate manner.
Stomatognathology	Whether the patient's stomatognathology (bite physiology) status has been assessed* and if there were stomatognathology problems. Furthermore, an assessment has been made as to whether the possible stomatognathology treatment has been evaluated within a reasonable time.
Medication/Antibiotics	Whether prescriptions of antibiotics were made in accordance with the Medical Products Agency's (MPA's) recommendations on antibiotic prophylaxis or antibiotic treatment in dentistry*.

The following main measurements were selected:

- Percentage of fulfilled and non-fulfilled efforts/measures, where the percentage of fulfilled was the ratio between fulfilled and the total of fulfilled, non-fulfilled and questionable and the percentage of non-fulfilled was the ratio between non-fulfilled and the total of fulfilled, non-fulfilled and questionable
- Lowest ranking (lowest 5) of non-fulfilled efforts/measures
- Percentage of patients with <25, <50, >90 and 100 % fulfilled efforts/measures
- Comparison of and correlation between percentage of fulfilled and non-fulfilled efforts/measures for T18 and T98.

3. Results and Discussion

The average percentage fulfilled efforts/measures for T98 and T18 for the 136 patients were 71 and 69 %, respectively (see Table 2). The corresponding percentage non-fulfilled efforts/measures were 27 and 30 %,

respectively. Thus, the average patient reached ca 70 and 30 % degrees of fulfilment and non-fulfilment, respectively. Very few questionable efforts were registered. With the use of T18, 12, 25, 22 and 7 % of the patients had 100, >90, <50 and <25 % fulfilment, respectively. Corresponding estimates for T98 were 0, 7, 9 and 0 %, respectively.

These findings show major similarities and some dissimilarities between T18 and T98, moderate quality of documentation and dental care, large inter-individual variability, cases of poor and excellent documentation and dental care, and development potential.

Six (6 %) and 4 (4 %) efforts/measures reached 100 and <25 % fulfilment, respectively. Areas with the highest degree of fulfillment include endodontic treatment, while areas with the lowest degree of fulfillment (57-60 %) were cariology and periodontology. The 5 efforts/measures with the lowest degree of fulfillment were

- the sum of performed/finalized dental care (6 % fulfilled; 93 % non-fulfilled),
- sensitivity test for non-root-filled teeth (21 % fulfilled; 79 % non-fulfilled),
- tobacco prevention performed (22 % fulfilled; 24 % non-fulfilled),
- adequate disease treatment evaluated prior to prosthetic treatment (24 % fulfilled; 71 % non-fulfilled), and
- documentation of implant surgery (31 % fulfilled; 69 % non-fulfilled).

Adequate caries treatment and use of antibiotics, and evaluations of general medical status and infection following implant surgery, are the efforts/measures with the lowest degree of fulfillment of the T18 items. Improvements in these areas are therefore of high importance.

There was good agreement between T98 and T18, as demonstrated by percentage fulfilled and non-fulfilled efforts/measures (see above) and high degree of intercorrelation between the versions for percentage fulfilled and non-fulfilled for the patients (Fig. 1). Correlation coefficients (R^2) for fulfilled and non-fulfilled efforts/measures were 0.75 and 0.76 (highest possible R^2 is 1), respectively.

A positive intercept (33.3 % fulfilled with T98 estimated at 0 % fulfilled with T18) and slope < 1 for fulfilled efforts/measures (Figure 1; left), and smaller positive intercept (11.1 %) for non-fulfilled efforts/measures (Figure 1; right), shows that T18 generally gives lower % fulfilment than T98 at low numbers (<70 %). Therefore, it appears to be more sensitive to find dentist/patient cases with inadequate documentation and dental care.

Overall, this demonstrates that T18, which is considered to cover the most important questions/factors about patient safety, can be used to perform a less time-consuming evaluation with maintained precision.

The large inter-interindividual variability and cases with inappropriate levels of science and proven experience and documentation are interesting and of concern. One can wonder about possible reasons for the existence of low individual levels of quality of documentation and dental care. Do they mainly depend on factors such as low quality of education and low level of examination requirements, cultural differences, differences in attitudes and responsibilities, limited experience, lack of interest in dentistry, lack of standardized routines, shortage of time and high stress levels, inadequate management systems and unawareness of processes, guidelines, laws and routines? This is something for further investigation. We have not reviewed whether the care providers have an adequate management system or established routines or focused on whether the care providers in their processes, guidelines or routines refer to national guidelines in dental care.

Table 2. Percentage fulfilled and non-fulfilled efforts/measures for the patients

	T98		**T18**	
	% fulfilled	% non-fulfilled	% fulfilled	% non-fulfilled
Median	74.8	23.2	74.2	25.0
Mean	70.9	26.8	69.0	29.8
Min	31.0	0	11.1	0
Max	98.7	60.9	100	88.9

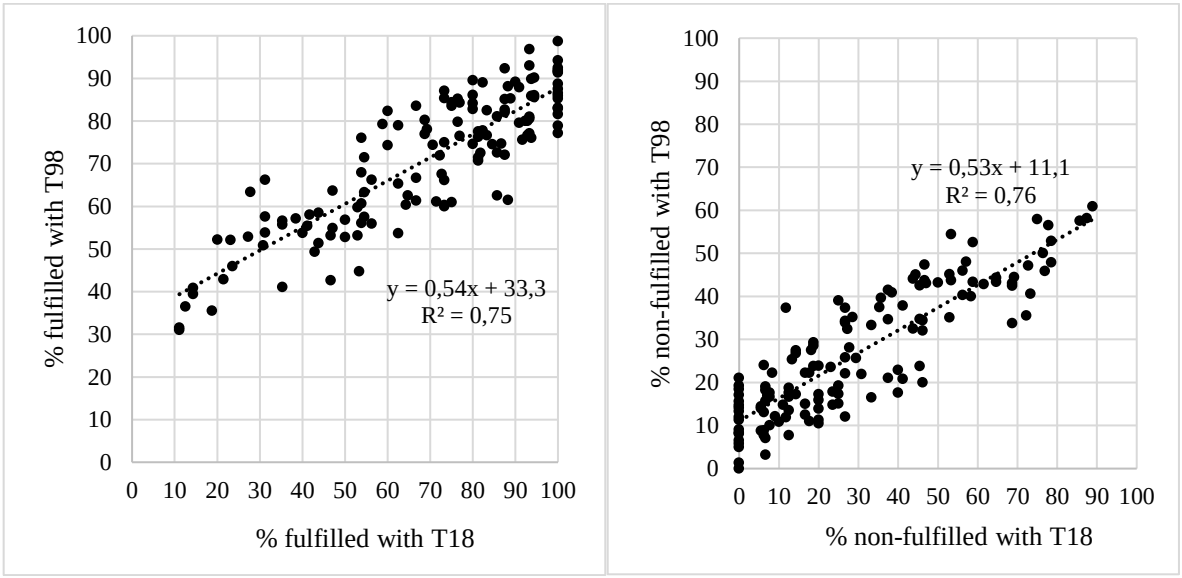

Fig. 1. Percentage fulfilled (left) and non-fulfilled (right) efforts/measures for T18 *vs* T98. Each data point represents the percentage of fulfilled efforts/measures for one patient

An evaluation like the present is required for finding and demonstrating shortcomings, problems, needs for improvement, and development potentials and areas. The fact that 7 % dentists reached 90 % fulfilment or more shows both development potential among many dentists as well as a high level of clinical quality by other dentists within the organization.

The need for valid, reliable and feasible quality measures, improved quality and establishing of robust evidence-based standards in oral health care was demonstrated in, for example, quality assessment and clinical practice guideline studies by Righolt et al. (2019) and Sachdeva et al. (2025). In the review by Righolt et al., which covered 2541 unique articles and 215 quality measures, only 2 and 3 studies reported on validity and reliability of the measures, respectively. Quality as an approach to guarantee each patient the range of diagnostic and therapeutic procedures that will ensure him the best result in terms of health was also highlighted by Gardette, (2010). Our work is also in line with the scope of the International Organization for Standardization, and the Dental Quality Alliance (DQA) (Dental Quality Alliance, 2025), whose objectives are to identify and develop evidence-based oral health care performance measures and measurement resources, advance the effectiveness and scientific basis of clinical performance measurement and improvement, and foster and support professional accountability, transparency, and value in oral health care through the development, implementation and evaluation of performance measurement. DQA has addressed a limited number dental quality measures for prevention and disease management, including evaluation of % of patients with periodontitis who received a comprehensive or periodic oral evaluation or prophylaxis. T98 and T18 provide broader and more detailed information about dental care.

Tokede et al. (2016) highlighted an overall suboptimal standard of clinical dental record keeping in studies conducted in UK, Australia, Scandinavian countries and USA, for example, 45 % completed medical histories, 21 % recorded periodontal screening and 9-87 % of cases with missing patient clinical information. In the present study, general medical status assessment, correct investigation of pocket depth and information of various treatment options were done in 42, 57 and 54 % of cases, respectively.

Limitations with the study include the fact that it is a single-organization pilot study and that assessments were done by one expert only. The external expert's long experience in odontology, assessments of dental care and quality of treatment, and the wide range of individual results (from 0 to 100 %), demonstrate confidence in the findings. Further studies with more patients and assessors will probably show results with higher statistical confidence and

similarities/differences in outcomes between assessors. In future studies, T18-evaluations before and after education and instructions will demonstrate the development potential among dentist in general and within Dentalum AB. There was also lack of independent validation, psychometric testing and predictions. Such work is suited for future studies with T18.

4. Conclusion

In conclusion, in this single-organization pilot study with limited method validation (assessments done by one expert, and no independent validation or psychometric testing), we reached the primary objectives of this pilot study - a) to develop a questionnaire for evaluation of the documentation and the quality of dental care in Swedish dentistry (T98), b) to use T98 to evaluate documentation and dental care quality within our organization (Dentalum AB), and c) to develop, validate, and evaluate a shorter, yet precise, version of the questionnaire (T18). Our findings align with the view that there is a significant knowledge gap regarding the actual quality of dental care provided. The results indicate considerable variability in compliance, with both areas needing improvement and examples of high-quality care. The T18 version proved effective for more rapid and convenient evaluations without compromising essential information.

Moreover, the substantial variation in individual compliance levels suggests that several underlying factors may contribute to the spread of results. These include variability in the quality of dental education and examination standards, differences in clinical experience, cultural and attitudinal variations, inadequate understanding of legal responsibilities, lack of standardized routines, time constraints, high workload, and insufficient management systems or awareness of existing clinical guidelines and regulations. Another explanation may be that academic institutions often deliver education in disciplinary silos, which impedes students' ability to develop an integrated understanding of patient care (Dental Care and the Healthcare Responsibility Committee, 2025). Furthermore, notable deficiencies in the implementation of national clinical guidelines limit the transmission of essential knowledge to individual practitioners - concerns highlighted in recent national reports (*Utvärdering av tandvården – Följsamheten till nationella riktlinjer*, 2025). These aspects warrant deeper examination in future investigations aimed at improving dental care quality and consistency.

Consent and Ethical Approval

It is not applicable.

Disclaimer (Artificial Intelligence)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text-to-image generators have been used during writing or editing of this manuscript.

Competing Interests

Authors have declared that no competing interests exist.

References

Dental Quality Alliance. (2025). *User guide for adult measures calculated using administrative claims data*. American Dental Association. https://www.ada.org/-/media/project/ada-organization/ada/ada-org/files/resources/research/dqa/dental-quality-measures/2025/2025_dqa_adult_measures_user_guide_final.pdf

European Regional Organization. (2016). *Quality in dentistry*. European Regional Organization. https://www.erodental.org/publications/reports/year/2016

Förordning om statligt tandvårdsstöd. (2008). *SFS 2008:193*. https://www.riksdagen.se/sv/dokument-och-lagar/dokument/svensk-forfattningssamling/forordning-2008193-om-statligt-tandvardsstod_sfs-2008-193/

Gardette, V. (2010). *Principles of quality assurance approach evaluation of professional practices*.

Inspektionen för vård och omsorg (IVO). (2018). *Patientsäkerhet och kvalitet hos små vårdgivare i tandvården: Nationell tillsyn 2017*. https://www.ivo.se/publicerat/rapporter/2018/patientsakerhet-och-kvalitet-hos-sma-vardgivare-i-tandvarden/

Patientdatalag. (2008). *SFS 2008:355*. https://www.riksdagen.se/sv/dokument-och-lagar/dokument/svensk-

forfattningssamling/patientdatalag-2008355_sfs-2008-355/

Patient Safety Act. (2010). SFS 2010:659. https://www.riksdagen.se/sv/dokument-och-lagar/dokument/svensk-forfattningssamling/patientsakerhetslag-2010659_sfs-2010-659/

Persson Kylén, J., Björns, S., Hägglin, C., Bellander, L., Brattbäck Atzori, A., Persson Kylén, S., … Wijk, H. (2025). Evaluation of collaborative oral health care planning between older adults and personnel from public dental care and municipal care organizations: A study protocol for a cluster-randomized controlled study in Sweden. *Trials, 26*(1), 57. 10.1186/s13063-025-08753-6

Righolt, A. J., Sidorenkov, G., Faggion Jr, C. M., Listl, S., & Duijster, D. (2019). Quality measures for dental care: A systematic review. *Community Dentistry and Oral Epidemiology, 47*, 12–23. https://doi.org/10.1111/cdoe.12429

Rolander, B., Jonker, D., Winkel, J., Sandsjö, L., Balogh, I., Svensson, E., & Ekberg, K. (2013). Working conditions, health and productivity among dentists in Swedish public dental care – a prospective study during a 5-year period of rationalisation. *Ergonomics, 56*(9), 1376–1386. 10.1080/00140139.2013.817613

Sachdeva, A., Kumar, V., Chawla, A., Priya, H., Kumar, V., Sharma, S., & Logani, A. (2025). Quality assessment of clinical practice guidelines and position statements on vital pulp therapy: A systematic review. *Evidence-Based Dentistry*. https://doi.org/10.1038/s41432-024-01104-5

Socialstyrelsen. (2025). *Utvärdering av tandvården – följsamheten till nationella riktlinjer* (Article No. 2025-6-9646). https://www.socialstyrelsen.se/publikationer/2025-6-9646/

Dental Care and the Healthcare Responsibility Committee. (2025). From root to crown – proposals for areas for government review of the dental care system (Article No. 2025-2-9441). https://www.socialstyrelsen.se/globalassets/sharepoint-dokument/artikelkatalog/ovrigt/2025-2-9441.pdf

Tokede, O., Ramoni, R. B., Patton, M., Da Silva, J. D., & Kalenderian, E. (2016). Clinical documentation of dental care in an era of electronic health record use. *Journal of Evidence-Based Dental Practice, 16*(3), 154–160. https://doi.org/10.1016/j.jebdp.2016.07.001

von Bültzingslöwen, I., Östholm, H., Gahnberg, L., Ericson, D., Wennström, J. L., & Paulander, J. (2019). Swedish quality registry for caries and periodontal diseases – a framework for quality development in dentistry. *International Dental Journal, 69*(5), 361–368. 10.1111/idj.12481

Peer-review history:
The peer review history for this paper can be accessed here:
https://pr.sdiarticle5.com/review-history/150183