

American Dental Association
Technical Report No. 1030

Dental Provider's Guide to the Electronic Dental Record

A Technical Report prepared by the American Dental Association and registered with ANSI.

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AMERICAN DENTAL ASSOCIATION TECHNICAL REPORT NO. 1030 FOR DENTAL PROVIDERS GUIDE TO THE ELECTRONIC DENTAL RECORD

The Council on Dental Practice of the American Dental Association has approved American Dental Association Technical Report No. 1030 for Dental Providers Guide to the Electronic Dental Record. Working Groups of the ADA Standards Committee on Dental Informatics (SCDI) formulate this and other specifications and technical reports for the application of information technology and other electronic technologies to dentistry's clinical and administrative operations. The ADA SCDI has representation from appropriate interests in the United States in the standardization of information technology and other electronic technologies used in dental practice. The ADA SCDI confirmed approval of ADA Technical Report No. 1030 on January 7, 2015.

Publication of this technical report that has been registered with ANSI has been approved by the American Dental Association, 211 E. Chicago Ave., Chicago, IL 60611. This document is registered as a technical report according to the *Procedures for the Registration of Technical Reports with ANSI*. This document is not an American National Standard and the material contained herein is not normative in nature. Comments on this document should be sent to the American Dental Association, 211 E. Chicago Ave., Chicago, IL 60611.

This technical report was prepared by SCDI Working Group 11.2 on Practitioner's Guide to the Electronic Dental Record. SCDI Working Group 11.2 prepared this report at the request of SCDI Subcommittee on Clinical Informatics (Mark Diehl, chairman).

The ADA SCDI thanks the members of Working Group 11.2 and the organizations with which they were affiliated at the time the specification was developed:

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FOREWORD

(This foreword does not form a part of American Dental Association Draft Technical Report No. 1030 for Dental Providers Guide to the Electronic Dental Record)

In 1992, there was interest in the standardization of clinical information systems related to electronic technology in the dental environment. After evaluating current informatics activities, a Task Group of the ANSI Accredited Standards Committee MD156 (ASC MD156) was created by the ADA to initiate the development of technical reports, guidelines, and standards on electronic technologies used in dental practice. In 1999 the ADA established the ADA Standards Committee on Dental Informatics (SCDI). The ADA SCDI is currently the group that reviews and approves proposed American National Standards (ANSI approved) and technical reports developed by the standards committee's working groups. The ADA became an ANSI accredited standards organization in 2000.

The scope of the ADA SCDI is:

"The ADA SCDI shall develop informatics standards, specifications, technical reports and guidelines and interact with other entities involved in the development of health informatics standards aimed at implementation across the dental profession."

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SCOPE

This technical report is intended to increase the awareness and knowledge of dentists and dental healthcare providers about key concepts of the Electronic Dental Record (EDR) and the standards development process. The document can serve as a primer on the subject and as a tool to help dental offices implement an EDR. This report is useful because the application of computer-based systems in the management of dental practices, both private and institutional, have proven to be a significant and necessary resource. Over the past 25 years computer based systems supporting patient care have evolved from accounting and administrative information systems to digitally based patient record systems.

This paper also serves as a primer for consumers, private and institutional, who will use and develop electronic dental records and/or components of these record systems, based on concepts of computer-based patient records and their application to dentistry. Perspectives related to the use of these systems in private practice, as well as institutional users such dental education and governmental organizations that provide dental care, are included as part of this technical report. The report is also intended to support the previously approved dental informatics standards: *ANSI/ADA Standard No. 1000, Standard Clinical Data Architecture and ANSI/ADA Standard No. 1027, Implementation Guide to ADA Standard No. 1000.* ANSI/ADA Standard No. 1000 is a model-based standard clinical data architecture that addresses the need for standardized electronic health data and provides a blueprint for developers of health information systems

Ultimately, the document's purpose is to improve an end-user's understanding of an EDR and its components as well provide an understanding of what can be done with computer-based systems that cannot be done with paper-based analog records. Additionally, this document will cover any implementation issues surrounding the computer-based oral health record.

To provide an adequate reference point, this document will provide users with a better understanding of the evolution of electronic records in dentistry. In recent years we have witnessed the migration from "clinical information systems and practice management systems" (PMS) utilized for business functions to "computer-based oral health records" that incorporate clinical point of care computing. With the vast majority of dental practices already "computerized," users of these systems need to become more knowledgeable about clinical data and patient record systems to become a more informed consumer.

Who Benefits from the Electronic Dental Record (EDR)?

Patient	Patient information is available at the "point of need"
Practitioner	Point of need access, decision support, effective patient management
Managers	Access to individual and aggregate information for effective management
Staff	Improve time management related to records management
Payers	Increase accuracy of information and efficiency of reimbursement process
Community	Improve health and manage of a population of patients

I. INTRODUCTION AND HISTORICAL PERSPECTIVE

How did we get here?

Going back to their initial training on a dental chart or dental record, dental providers and staff will recall that medical and dental records used to be cryptic notes intended only to aid the doctor in treating his/her patients with reminders such as what had been accomplished for the patient as a reference point for the patient's next visit. A significant driver to the change in records purpose for healthcare in general was the medical-legal aspect that transformed records from more than just cryptic provider notes to documentation and demonstrations of the quality and thoroughness of care. In comes the new adage "if it wasn't written down it didn't happen" and records became much more sophisticated and detailed in the information collected. This paradigm shift in documentation helped support initial steps for improving patient care, managing patients and supporting better patient outcomes.

It was 40 years ago or more when one observed the first electronic systems appearing in dental practices. Many of the initial efforts were completed by a team of dentists and computer programmers developing systems from a narrow perspective. These electronic systems were principally administrative and transactional in nature and their principal function was to be an accounting system. That is, they were in no way intended to replace the dental chart or record used in the operatory.

As some of systems gained more market penetration, additional features were added and these dentist-programmer teams became "vendors" of practice management systems (PMS). PMS increased functionality included in patient and professional communications as well as electronic transmission of information for payment for services provided, such as creating insurance claims. Let us not forget most systems initially were text based in terms of entry, retrieval, and display of the information in them. It wasn't really until the 1990s that graphical systems for dentistry matured to be viable in PMS. This lead the way toward the consideration of how these systems could be used more efficiently, as well as intuitively, and could now be considered for use at the dental chair.

Another significant effort over the past 20 years has been the transition from radiographic film to digital images. Over the past 15 years technology has evolved to integrate seamlessly multiple information systems. These have been done so that to users in dental offices they appear as one system centered around the patient. In addition to PMS and EDR vendors, companies developing specialized products for patient communications, digital imaging, dental laboratory support and patient education have programmed these systems to exchange or access/link from Electronic Patient Record systems. Prior to data exchange standards development, either through recognized standards processes or "de facto" standards based on market share, initial systems developed for use in dentistry were proprietary in nature. This obviously presented significant obstacles when providers needed to exchange data between proprietary systems or change systems and/or vendors.

II. The Electronic Dental Record

What is an electronic dental record and what's different about it than the paper-based record?

What is an electronic oral health record, also known as electronic dental record (EDR)? In the strictest sense it is the part of the record that has to do with the direct patient care interaction. This is in contrast to the things we do from a business perspective such as accounting for the charges for patients' care, the dates of their appointments, and the practice schedule. We need to look at what we have done in terms of collecting information about the patient, e.g., histories and physical examinations, documenting those findings, and maintaining the narrative of the patient's treatment.

In 1919, the American College of Surgeons specified the nature of the information comprising the patient's medical record as:

- patient identification data,
- the chief complaint,
- personal and family history,
- history of the present illness,
- results of the physical examination,
- results of consultations, radiographic examination and clinical laboratory,
- a provisional or working diagnosis,
- medical and surgical treatments provided,
- progress notes,
- histopathology – gross and microscopic findings,
- the final diagnosis,
- patient condition on completion of care,
- follow-up notes, and
- autopsy findings in the event of death.

In its 1919 Minimum Standards, the American College of Surgeons established that the information in the patient's health record be complete, accurate, and accessible. For most of the twentieth century, patient health and other clinical data were typically recorded and maintained as a paper record. In the last two decades, however, this media failed to keep pace with operational, regulatory, and technological advances. The advantages of automation over physical media in integrating and presenting patient health information, and the common body of professional knowledge for clinical care, are further reasons for applying information technology to clinical care. We also know that the record has been the collection point for diagnostic aids for the patient, the major component of which being imaging or radiography.

We are now in the “digital world,” where information is in a computer readable format, providing benefits in terms of access to information, its retrieval, and sorting and leveraging when the collected information is aggregated. Now we have the ability to tie together administrative information and functionality, such as patient registration and financial transactions directly with the clinical aspect of patient care.

Many healthcare professionals originally thought about the initial approach of this change from paper to computer-based records more in terms of recreating what we did with paper charts in an electronic form. With that mindset, information from the dental record is a static representation, non-searchable or reportable, making it unusable for practice management and practice analysis, for example. Thus, an approach of codifying the information collected for the creation of databases was developed. This approach made the information retrievable and sortable so it could be used in a more meaningful way.

Today, we need to think in terms of modules of functions that form the EDR, fitting together in a matrix create we can think of the contemporary EDR in whole. It's actually much like a car manufacturer or a computer manufacturer who integrates components to build a useable product. From the perspective of understanding the EDR, we will discuss the separate components that form the whole of the record in this report.

These special features, or add-ons to technologies such as imaging, electronic claims, or electronic communications, often were supplied by different vendors that had separate systems that many times required duplicate entry of patient names in chart numbers, for example. But in recent years strides have been made toward achieving a vision of an

integrated record, wherein systems such as imaging, electronic record, administrative systems, and communication systems are able to exchange information with each other seamlessly.

To reduce the data redundancy necessary to run a dental practice today, we must think about how to leverage this information for such purposes as decision support, integration of evidence-based care, analyzing practice metrics to make our practices more efficient and effective, improving patient safety, and improving patient communications. This is why today we think of the electronic dental record as more than just the one practice management system, but again as a variety of components melded together to allow us to provide patient care, to document that care, and to use the information effectively to improve the quality of our patient care and our practices.

In sections ahead, we will discuss the components of the EDR, how they relate to the electronic medical record, and how they comprise a whole system in terms of patient care. We'll look at what is driving its implementation as well as some of the clear implementation issues. Additionally, we will look at how electronic records for the private practice are different than institutional settings, how this standards in dental informatics and dental computer technology play a role, and finally we will review some of the practical uses and benefits of the EDR today and where we will be going with them in the future.

III. The Paradigm Change

What's driving the use of information technology and electronic health records?

One of the answers is that "*the horse left the barn.*" Our society has embraced the digital era. We have seen and recognized the benefits of this transfer and access to information. Now, there's actually become an expectation that all fields should be able to use technology and information systems for improvement in efficiency. There is now an expectation for the evaluation of the quality of care and for changes in strategy and direction to be made if problems are noted. We have seen a logarithmic growth in terms of capability and computing power at the point of care or the point of experience. We have also seen a tremendous reduction in the size of computing devices along with increased computing power and significant advances in the clarity of the visual display (screen resolution). We've also seen significant increases in networking capability, increasing how much and how fast data and electronic information can be transferred and retrieved. Furthermore, we have seen tremendous changes in operating systems that allow computers to handle much more complicated instruction sets. The government has intervened in terms of its concern for patient quality and safety – more recently manifested by the meaningful use criteria for certified electronic medical and dental records. Finally, we have seen a change in business-to-business strategy, where electronic technology has become a way of doing business. All these factors are impacting the dental practice and driving us to incorporate PMS/EDR systems into our practices.

IV. Adoption of the Electronic Dental Record

Why should we be interested in EDR; what are the benefits for the practice, the dental team and their patients?

Initially, the automated health record was only an electronic equivalent of the traditional paper or problem-oriented record. Computer-based patient record vendors limited their products to a change of media, with the computer screen and printout replacing the previous hand or typewritten text pages. While many electronic health record products continue to be automated versions of paper-based documents, experience has revealed that merely exchanging paper for electronic technology carries along many of the shortcomings of paper documents. In addition, when working with larger patient loads and increasing volumes of clinical data, many of the failings of paper documents are magnified by the efficiency which automation provides. Retaining the look and feel of paper-based health records directs attention to

the form of the record rather than the substance of its data content and how this data is best used by the individual clinician. It leads to a focus on the interaction with the user rather than how the information content can be best employed to enhance personal health, care delivery, documentation, and other critical uses.

The 1997 revision of the Institute of Medicine report [14] on the computer-based patient record effectively summarizes the failings of the paper document among the reasons for automating patient records. Additionally, Murphy [15] discusses the impact of technology on this collective body of patient and related clinical data to clinical care as well as summarizes the rationale for transforming the paper-based health record to an electronic health record.

There are many reasons for transitioning from the paper-based health record to an electronic one. But let us just mention a few. PMS/EDR systems allow practitioners to use information when and where we need it, including at the point of care, the front desk or at the doctor's home or wherever it may be helpful to have information available to discuss with the patient or enhance the patient care process. The systems help manage patients better from a scheduling perspective and make the administrative functionality of the dental office more efficient and effective. Electronic systems facilitate patient safety and patient satisfaction by guiding us, in terms of information collection, to an effective diagnosis treatment plan for our patients. This provides significant patient management capability and improves our communication with patients.

We are now in the era of electronic financial transactions and PMS have provided a means of collection of data at the "point of care" making the transactional component of dental care more efficient. Now, we are looking at venues for patients to access and update their own information by being able to tie systems together to enable patients to perform these tasks. The technology has allowed us to better engage patients in their care by their visualization of problems, represented either graphically or narratively. We now have entered an era where the dental record, histories, and financial transactions are tied together with imaging and communication systems. The use of electronic records has been determined to be necessary for improving patient safety reducing error rates, lowering administrative costs, as well as providing a "seamless" health care record.[citation needed?]

Now, governmental initiatives are in place to promote and incentivize providers to use electronic tools. Increased efficiency in the practice of dentistry can be realized through improved patient management that results from effective access to patient care related information when and where it is needed. With the use of databases and query tools, longitudinal "quality assurance and improvement" programs can be implemented. In addition, strategic planning for the dental practice, whether private, educational or governmental, must be supported by objective data derived from patient information systems. Society is demanding accountability for treatment outcomes and the rapid identification of epidemic problems, diagnostic or therapeutic. Computer-based systems are the only realistic way to support these efforts. As these solutions are taken to the point of care, interactive linkages to knowledge bases, such as drug information systems and practice guidelines, will further facilitate the quality of patient care. The ultimate goal is for those who need access to comprehensive electronic health records at the point of patient care to be given authority in secured and protected manner.

V. The Electronic Oral Health Record / Electronic Dental Record

What is an electronic dental record or an electronic oral health record?

As we discussed earlier, the EDR is actually a multitude of components. It consists of the electronic dental record application, an imaging system, a prescription system, a scheduler, and additional functions that will be described in the next sections of this document. To specify what needs to be in an EDR from a database standpoint, *American Dental Association/American National Standards Institute (ANSI) Standard No. 1000—Standard Clinical Data*