Medical care providers' perspectives on dental information needs in electronic health records

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The use of electronic health records (EHRs) has demonstrated value in promoting health care providers' efficiency and effectiveness.[1] EHRs have empowered health care providers by allowing greater access to patient health information and communication tools that facilitate shared decision making, resulting in better patient health outcomes. This digital health environment has opened further avenues for establishing a medical-dental integrated EHR (iEHR) that encompasses development of common platforms spanning diverse specialties that support communication and exchange of knowledge, skills, and health care information.[2,3]

Supplemental material is available online.

A growing body of evidence attests to the negative contribution of chronic oral inflammation on overall health. This includes exacerbation of systemic conditions in which pathophysiological change is driven by inflammatory processes, including diabetes, Alzheimer disease, and cardiovascular disease.[4] In some instances, investigators have identified bidirectional exacerbation of inflammatory processes, highlighting the need for establishing coordination between medical and dental care providers.[5-7] Medical care providers have diverse informational needs, including oral health information, required to make informed clinical decisions, diagnoses, and care plans.[8,9] Hence, there is a need for additional accessible dental information to inform diagnosis, prognosis, and treatment options necessary to support patients and their families in making informed decisions. Integrating an oral health component into the EHR would give

ABSTRACT

Background. The authors conducted this study to identify the most relevant patient dental information in a medical-dental integrated electronic health record (iEHR) necessary for medical care providers to inform holistic treatment.

Methods. The authors collected input from a diverse sample of 65 participants from a large, regional health system representing 13 medical specialties and administrative units. The authors collected feedback from participants through 11 focus group sessions. Two independent reviewers analyzed focus group transcripts to identify major and minor themes.

Results. The authors identified 336 of 385 annotations that most medical care providers coded as relevant. Annotations strongly supporting relevancy to clinical practice aligned with 18 major thematic categories, with the top 6 categories being communication, appointments, system design, medications, treatment plan, and dental alerts.

Conclusions. Study participants identified dental data of highest relevance to medical care providers and recommended implementation of user-friendly access to dental data in iEHRs as crucial to holistic care delivery.

Practical Implications. Identification of the patients' dental information most relevant to medical care providers will inform strategies for improving the integration of that information into the medical-dental iEHR.

Key Words. Medical-dental integration; medical care providers; integrated electronic health record; dental information; focus group.
JADA 2017:■(■):■-■

http://dx.doi.org/10.1016/j.adaj.2017.01.026

medical care providers access to their patients' oral health information, which could contribute substantively to continuity of holistic patient care. Furthermore, this information may assist medical care providers in screening

for the presence of many systemic diseases that manifest symptoms in the oral cavity, promoting early detection or avoiding the exacerbation of comorbid conditions.[10,11]

The focus of this study was to identify dental information most relevant to medical care providers at the point of care to inform holistic treatment and to support continuity of care for patients. The Marshfield Clinic Health System, headquartered in Marshfield, WI, is positioned uniquely for defining elements of dental EHR architecture with highest relevance to medical care providers by virtue of its homegrown medical EHR. We developed this EHR internally over the past 4-plus decades, and it includes a robust medical-dental iEHR established in 2010.[3,12,13]

This study is a follow-up to a baseline survey our study team first undertook to define the patient data most informative to medical care providers' dental informational needs.[8] This initiative expands the scope of specific dental informational requirements among medical care providers across a range of medical clinical specialties and administrative units. The goal was to define what medical care providers viewed as essential, fundamental, oral health information to be captured in an iEHR.

METHODS

Study setting and data collection. Focus groups provide a fast, flexible, and inexpensive way to glean insight into end-user attitudes, behaviors, and needs.[14,15] In the study, we used a qualitative design involving focus groups conducted at multiple medical centers to collect feedback. We conducted focus groups with participants representing a broad diversity of domains, including clinical, administrative, and technical. The study team initially contacted 81 medical care providers within the Marshfield Clinic Health System by telephone or e-mail to invite them to participate in the focus group sessions. We then recruited participants from 8 of 57 regional medical centers across the Marshfield Clinic Health System.

We developed and piloted a focus group interview protocol (see Appendix, available online at the end of this article) within the Marshfield Clinic Health System. We scheduled approximately 1 hour for each focus group session to allow the participants to relay their opinions descriptively. A trained moderator steered the discussion topically and ensured participation from all participants. The moderator led focus group participants through the carefully planned discussion facilitated in a permissive environment. The environment and discussion deliberately applied no pressure on participants to reach a consensus, thus allowing opinions of 1 participant to evoke a reaction or interaction from other participants. The moderator asked questions about participants' roles, adapting wording and sequence of questions from the protocol to suit the natural flow of the discussion. The moderator asked participants about their perceptions, opinions, beliefs, and attitudes with respect to domain division associated with the practice of medicine and

dentistry; the medical-dental iEHR environment; cross-disciplinary communication, including dental consulting and patient referrals; dental information relevant to medical practice; and system design.

We audio and video recorded all focus group sessions. We collected the specialties and roles of the medical care provider participants, but with no links to personal identifiers. We subsequently transcribed the focus group session recordings verbatim, with any potential identifiers redacted. Via expedited review, the Marshfield Clinic Research Foundation's Institutional Review Board reviewed and approved the study.

Data analysis. We used a general inductive approach that supported grouping of the frequent and important themes, followed by data analysis by using the methodology of Braun and Clarke.[16,17] Specifically, we used thematic analysis methodology[18] to identify any patterns in the statements the participants made. We segmented the transcribed copy of each focus group session according to the statements the participants made. We labeled these segmented statements as annotations. We assigned each annotation an annotation identifier.

Initially, 2 of us (A.M., R.M.) independently analyzed transcripts through multiple readings and review sessions of audiotapes to extract thematic categories for sorting annotations. We highlighted key words, phrases, and concepts in the text to distinguish major and minor themes. After reviewing any coding discrepancies, the reviewers reached consensus and developed a codebook (Table 1) ($\kappa = 0.58$, reflecting achievement of 87% interrater reliability). The codebook groupings broadly categorized the relevance of the annotations into 1 of 6 categories: useful, may be useful, not useful, neutral, need more details, and not applicable. For the purpose of statistical analysis, we created relevant and nonrelevant groupings by condensing the 6 categories into 2 categories wherein relevant captured useful and may be useful and not relevant captured not useful, neutral, need more details, and not applicable. Only 3 respondents selected either neutral or may be useful across all of the major codes, so we deemed that creation of a third neutral category would not be informative.

After grouping the annotations into relevant or nonrelevant categories, we further coded every annotation to major and minor themes. We identified the following 18 major themes: communication, appointments, system design, medications, dental alerts,

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ABBREVIATION KEY. DDS: Dental Diagnostic System. **EHR:** Electronic health record. **HIPAA:** Health Insurance Portability and Accountability Act. **iEHR:** Integrated electronic health record. **LPN:** Licensed nurse practitioner. **MA:** Medical assistant. **MD:** Physician. **NP:** Nurse practitioner. **RN:** Registered nurse. **SNO-DDS:** SNODental Diagnostic System. **SNODENT:** Systematized Nomenclature of Dentistry.