Enhancing Dental Care Access: Introducing the Electronic Dental Referral Management System

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Abstract

Approximately 14% of Californians do not have any form of dental coverage. To alleviate financial barriers and improve access to dental care, we devised an integrated system, the Electronic Dental Referral Management System (EDRMS), to streamline the process of addressing oral health concerns in children from screening through treatment. Using Microsoft Power Platform, we implemented an Entity-Relationship Diagram (ERD) to create a model-driven app. We designed a data model based on the ERD and designed the app's user interface and business logic. The app operates as follows: after parental consent is asked for an initial screening, the approved children undergo an initial oral health screening; screening results are used to determine treatment urgency; children are referred to providers and a treatment plan is developed. Overall, the EDRMS can significantly improve dental care by streamlining patient referrals, enhancing treatment coordination, and identifying trends to enhance overall oral health outcomes.

Background

The Office of Oral Health, California Department of Public Health has requested the creation of a California Dental Referral Management System and Oral Health Data & Statistical Coordination Center to link children and parents to a dental provider, track referral closure, and measure performance of the program. The Oral Health Data & Statistical Coordination Center is supporting the development of the Electronic Dental Referral Management System (EDRMS). The Center will oversee data processing and management, and conduct analyses and program evaluation for the California Dental Referral Management System. The Center also will support related oral health data processing and data and statistical analyses needs for the state oral health program and local oral health programs.

The California Children's Dental Disease Prevention Program (CCDDPP) was established to provide funds to local agencies for comprehensive dental disease prevention efforts. The mission of the CCDDPP is to assure, promote, and protect the oral health of California's school-aged children. The Local Oral Health Program grant to Local Health Jurisdictions is a funding opportunity to establish linkages between schools and clinicians to promote clinical preventive services and healthy lifestyles.

The Referral Management System will enhance communication among school dental programs, providers and parents. The system will be able to track closure of referrals and allow for expanded use in other community settings to facilitate linking younger children to local sources of dental care.

Conclusion

At the current stage of development, we have designed and implemented the underlying data model. We have established relationships between data tables and created the necessary attributes. Additionally, we have built several automated processes using Microsoft Power Automate which are triggered by changing data within the EDRMS.

Once the EDRMS is operational, it will be used to conduct comprehensive data and statistical analyses of the data collected across local oral health programs to meet the needs of the state oral health program and local oral health programs' report writing, information dissemination, and public oral health education, and for informing oral health policy and program evaluation, quality improvement, and creation of effective interventions to improve the oral health of California children.

Methods

EDRMS Entity-Relationship Diagram

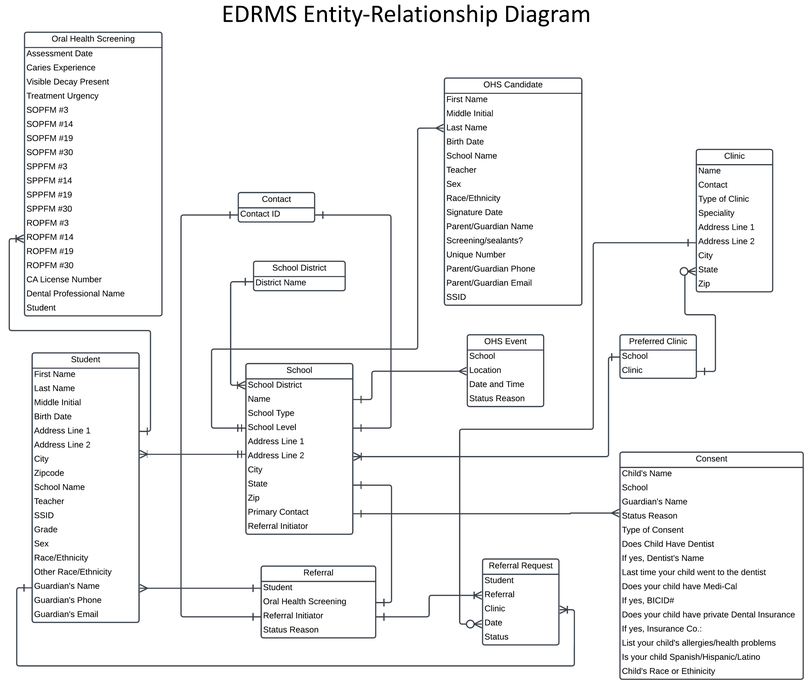

Figure 1. This entity relationship diagram (ERD) depicts the underlying data model of the EDRMS. Relationships between data tables are indicated by the lines connecting the tables. The cardinality of the relationships (e.g. one-to-one, many-to-one, many-to-many) are shown on both ends of each line. The columns (attributes) of each data table are shown enclosed by the rectangle that identifies each data table.

Student Screening and Referral Flowchart

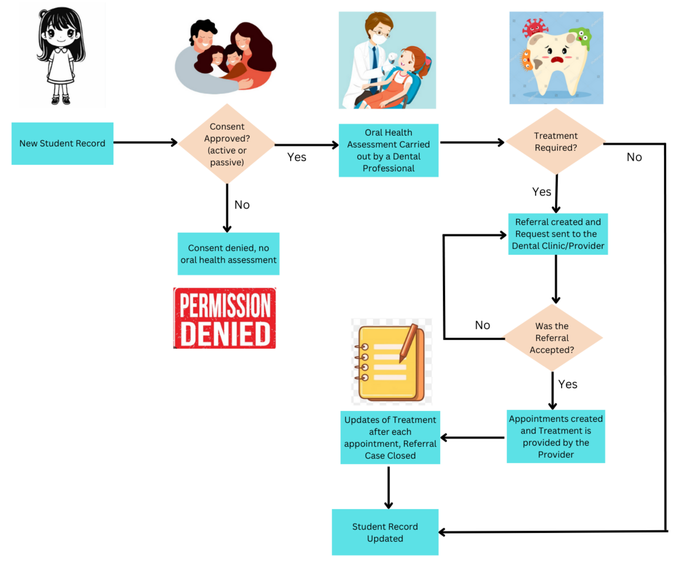

Figure 2. Educational institutions submit student rosters for the Oral Health Screening Program (OHSP). Consent records are generated and sent to parents, and responses are logged. Every school will use either passive consent or active consent. In the case of passive consent, children are approved for screening after parents take no action for one week.

Upon consent, Oral Health Screening Events occur, followed by referral requests for urgent cases (type 2 or type 3). Dental providers can either accept or deny referral requests. Then an initial appointment occurs, and the dental provider creates a treatment plan. Treatment status is updated in the portal after every appointment. Upon completion, the referral is marked "complete," triggering an email to be sent to the referral initiator.

Results

Power Automate Flowchart

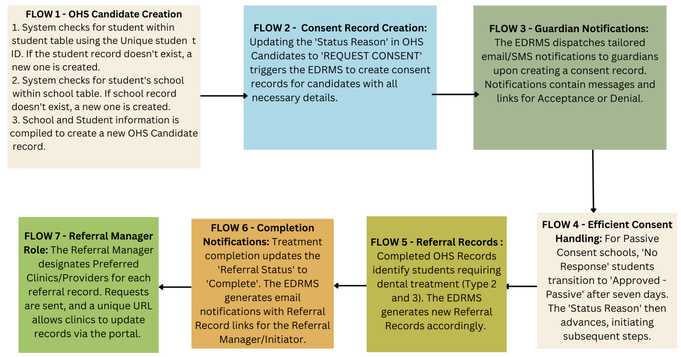

Figure 3. In Power Automate, a flow refers to an automated sequence of actions or steps that are designed to perform specific tasks or processes.

Each flow consists of triggers, conditions, and actions. Triggers are events that initiate the flow, such as the creation of a new email or the addition of a new record in a database. Conditions are logical checks that determine whether certain actions should be executed based on predefined criteria. Actions are the specific tasks that are performed as part of the flow, such as sending an email, creating a record, or updating a file.

Flows can be used for a variety of purposes, such as automating approval workflows, syncing data between different systems, and notifying users of important events. They are particularly valuable for streamlining repetitive tasks, reducing manual effort, and ensuring consistent and error-free execution of processes.

In the EDRMS, we are utilizing Power Automate flows to automate and streamline various tasks within the system. These flows are designed to enhance efficiency, reduce manual effort, and ensure a smooth workflow for different stages of our project.

Creation of New OHS Candidate Record

1

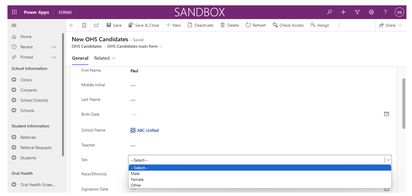

Figure 4.1 This screenshot of the user interface, depicts how a user would add a new student, Paul Williams, to the OHS Candidates table since he is eligible for the Oral Health Screening Event. The status reason that is chosen, 'Ready to Process', will trigger the flow.

2

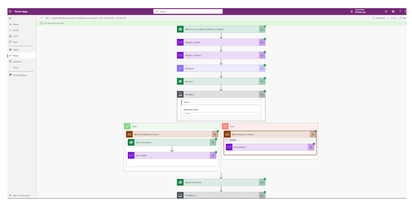

Figure 4.2 This screenshot in the middle depicts that the flow has run successfully. Once the status is 'Ready to Process', the system searches the Student table to check if the record already exists. If the record is not found in the Student table, the flow will create a new record for that student in the Student table.

3

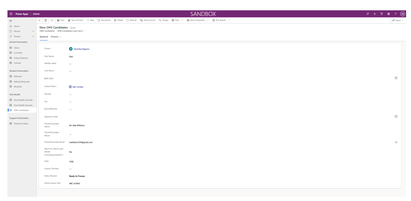

Figure 4.3 This screenshot shows how a record for the student, Paul Williams, was not found within the Student table. The flow ran successfully, and now the Student table reflects that a new record has been created for Paul Williams. Finally, a new entry has been created within the OHS Candidates table for Paul Williams.