

Alaska Medical Library Database

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Abstract

Too many cooks. As data is entered and manipulated, there are many opportunities for corruption to occur, many more when a system is updated or improved upon, so enforcement of referential integrity is an essential part of building an effective database. If integrity is not strictly enforced, data can become more corrupted and inconsistent as time goes on. Eventually, the corruption becomes so invasive, there is no choice but to scrap the database and begin again.

Introduction

Our project was to work with the Alaska Medical Library to design and create a database to replace the system currently in use. This system was created as a student project several years ago and has since gone through several iterations. Corruption began, and eventually the database became slow and the data inconsistent. Additional concerns included the reports, which were limited in scope and purpose, and the interface, which was complicated and disorganized. This report will be an overview of the project with more technical details to be included in the manual attached.

Project Overview

The requirements for the finished product included a system that allows the client to track and report information regarding their clients and the services provided. Ease of use must be balanced with efficient and thorough handling of data. Our project focus was working with the client to design a database that both met their current needs and would be stable through updates and expansion in the future. Due to time limitations, our focus became the creation of a basic structure that can be enhanced and expanded by other groups in the future.

Project Requirements

The Alaska Medical Library uses their Access database to track services provided to their clients, as well as for basic accounting. There are several different types of services, as well as a number of different client types that must be accommodated; prices and billing practices differ between different combinations of client and service; organizations are billed differently than individual

clients; some organizations are billed through contracts while some are billed through deposit accounts; some people belong to more than one organization and some are billed individually. The client must be able to enter new clients, including details such as their billing status and relationship to a specific organization or to more than one organization. Each service and payment must be entered with reports generated to find both current activity and past history.

Tables

The old database consisted of a large number of tables which appear to be in two distinct groups. It is our best guess that one of the groups of people working on the database at some point simply copied the tables over in order to work with them, leaving many tables that are actually duplicates. Some tables are not in a direct relationship to any other tables and were apparently generated strictly for production of certain reports. Incomplete records also helped compromised the relationships between tables. See Appendix A for the full ER diagram of previous database as created by Access. This ER diagram shows all tables, including those generated by queries.

We started by looking at ways to combine tables and simplify relationships. Several tables contained duplicate information or partial information and could be combined and the data refined. The identifier table was created as a junction between the people and organization tables, assigning a unique identifier to each combination of individual and organization. This identifier serves as a foreign key for many of the other tables in the database and is used in the places that previously used either the PeopleID or the OrgCode to provide a unified system to track clients through the order and billing process.

Many of the tables in the new database are similar, if not identical, in form to those in the old database in an effort to maintain as much consistency for the users as possible. Names of fields were changed in some cases for the sake of accuracy and clarity. Appendix B contains the ER diagram for the new Database.

Queries

In the old database, many queries from previous iterations were replaced but not removed. As each group of students began working on the database, new queries were added to address the pressing needs of the users but it does not appear that much was done in the way of cleanup. This resulted in a number of queries that were unnecessary and unused, as well as many that were very limited in scope. There were a total of 88 queries in the old database between the reports and the forms, while the new database has fewer than 20. Many of the functions performed previously through queries are now contained within reports.

Reports

The reports were one major focus of concern for our clients as much of their business uses reports and forms generated by this database. The older version contained many reports that were created for specific purposes and allowed for no flexibility. This caused problems for the clients as time progressed and their needs changed. Reports became unusable and were replaced but not removed. Other reports were added as requested by the clients, but all were limited in scope due to lack of options.

In order to give the clients the most effective and adaptable system possible, we elected to create fewer reports with more options. This translates to more input will be required to run an individual report, but each report can be customized each time to pull the specific data needed by the client. To further increase the potential for each report, an option is included for each that will export the data into Excel. This will enable further organization and filtering of data as needed.

By requiring the user to actively specify more parameters with some reports instead of automating them, we were able to combine more than 15 of the previous individual report processes into a single process which also had added features requested by the clients. For many of the accounting and record keeping purposes, the clients need to be able to pull all services provided to single organizations as well as specific combinations of organizations. In the previous incarnation of the database, many of these reports were created individually to

pull a single organization or combination and the clients were not able to alter these parameters. During one iteration, an addition was added that allowed the client to make a change to the organization, but only in Access's "Design View" which is not really designed for end users. It was technical and complicated and only allowed for one organization id to be entered at a time. In order to accommodate these reports, plus any future needs the client might have, a single report was created in which the client can select up to ten organization codes to display all service history for a specified date range. If a report is ever needed for a greater number of organizations the form can be modified fairly easily, or if that is not feasible at the time, the data can be exported to Excel in batches and combined as needed.

Interface

Cluttered and disorganized, the interface for the old database represented the most visible problem. With numerous tabs clustered at the top of the form numerous options on most of the forms, determining the correct procedure for entering new searches would be a considerable challenge for a user that was unfamiliar with the system. The tabs were not static in position and changed location based on which were selected and were labelled only with table/report names instead of their purpose or use. Many tabs contained no text fields, no instructions, and no indication of actual purpose, just a table name and the spreadsheet style view of that table. With no additional information, the user is left to simply "know" how to utilize the form.

In the new database, the interface is basic but functional. With the tabs organized into main categories going down the left side and subcategories across the top. The main categories are the tables and reports, while the subcategories are the actions that can be performed on each. It is much more clearly labelled than the old interface, with the purpose of each report and form listed on its specific tab. Text fields are kept to a minimum and labelled clearly. This was one area in which we concentrated on function over form. Due to the time required to transfer the data from the older database, the schedule did not allow for extensive work on the layout and formatting of the interface. The idea was that another group can come in later to tweak the interface aesthetics.

Challenges/Potential

One portion of the interface that will need to be fixed is the "New Service" process. Prices for services are based on type of service as well as type of organization, with Non-Profit clients charged a lower rate than For-Profit clients for each service type. Payments and gifts are also entered into the system through this screen, with differing amounts each time. Currently the price does not auto-populate in this form, but must be entered manually by the user. In order to facilitate data entry, we have created a text display that shows whether the service will be billed to an organization or directly to a client, whether the organization/client is Non-Profit or For-Profit, and the prices for the selected service. This will enable the user to choose the correct price for the entry without having to look it up or remember it and allows for entry of payments in various amounts.

We finished basic database construction within the first week of our project. One of the biggest unforeseen challenges was consolidation of data, with a majority of our time spent attempting to make sense of the old data and put it into our tables in a cohesive form. Incomplete data and undefined relationships caused some data to become unusable when placed into a database that enforced referential integrity. We kept records of this data as it had to be removed from the new database in order to ensure integrity. Due to these complications, the process of migrating the data stretched from the two weeks we anticipated to encompass most of the summer. The final two weeks of this project have been dedicated to the design and implementation of reports.

Conclusion

Working with our clients was a pleasure, and the database presented unique learning opportunities. Overall, this project was larger in scope than expected, but challenged us to strive toward higher levels professionalism and achievement.