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# Desktop Databases for small Companies: How to Access Data and Easily Find Information

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One of the great challenges for any insurance company actuary is to obtain company data for everything from experience studies to financial reporting. If this is hard for large companies, it can be even more difficult for small companies without the large company resources. Until recent years, unless actuaries became information system (IS) specialists, they were at the mercy of the IS people to provide this data. Some IS experiences are great, some not. But they always take significant time and effort to make sure the actuary gets what is intended.

With recent advances in desktop software and hardware, the periodic sessions with the small company IS personnel can be largely curtailed. The IS personnel can be left to do all the other company tasks they are called on to do, and the actuaries can get what they want, when they want it, and how they want it. What once was a potential bottleneck can no longer be a concern. The old challenge of "getting the numbers" is removed, and the new challenge becomes data integrity, something many actuaries didn't have time for previously.

Why should an actuary use a desktop database program? Compare mainframe databases to a hand saw. The hand saw certainly cuts wood and has performed competently for years. Then when a competitor shows off a new power saw, carpentry is revolutionized. It's fast. You don't tire quickly. But there will be a small learning curve if you don't want to be dangerous or make mistakes. This article isn't a complete owner's manual

but should serve as good advertising for that "power saw."

Though many database programs exist, this article will look at experiences using MS Access in smaller companies. While the author has used Access effectively in large companies, it was not for company-wide data analysis, rather, for example, for experience studies on one line. Capacity limits do exist for the desktop, though they are rapidly receding. If capacity becomes an issue for a smaller company, MS Access is made to upgrade to MS SQL server, which should handle data sizes and data accessing issues for several years of even strong growth.

Desktop databases are not new, and many actuaries use them regularly. However, for those actuaries who have been too busy to learn what these databases can do, this article aims at giving some of that understanding.



## What you still need from IS

MANY IS DEPARTMENTS ALREADY produce a flat file (text file) of policy records (call this the "policy master file") that contains all the needed fields, e.g.,

policy number, date of issue, policy form number, issue age, riders, policy change codes, etc. This may be all the actuary needs to do financial reporting. If this file is not currently produced, a one-time effort will obtain the file, and the extract program generating it can be put "in production" to automatically generate periodic updates.

Now, by setting up a table of reserve factors for all the non-interest-sensitive products, it is possible for each non-interest-sensitive record in the policy

master file to have a reserve factor tied to it and a reserve calculated. The reserve factor table may have five fields: form number, reserve basis, issue year, duration, and reserve factor. This one table has all the non-interest-sensitive reserve factors. Perhaps it makes sense to have separate tables for PUAs or other items, but this can be worked out in accord with the structure of each company's policies.

Not only can the actuary tie in reserve factors, but it is straightforward to tie in a mortality basis, for example, the 41 CSO table if the company desires to track experience based on this table for Exhibit 8, line 10c. Similarly, other experience studies with their various mortality tables can be accomplished.

Querying, or questioning the database, by policy change codes will give all the information needed for the Exhibit of Insurance. Realistically, these numbers will need a sprinkle of judgment added, as they never seem to add up correctly. These same policy change codes give data for calculating the Analysis of Change in Reserves.

## It Sounds Easy So Far

...AND IT ISN'T TOO bad...except...the constant problem of data integrity, the new challenge. Even in the largest of companies, there is the possibility that the system didn't do everything the actuary may have wished. Perhaps the data entry didn't happen correctly, or a paid up policy is still on the old reserve basis. Glitches should be expected. These should be sought out,



routed back to the IS people to fix, sent to the data input people to help them improve their processes, and then revised on the policy master file. If these are not corrected each year, their error is added to last year's errors and becomes more than a de minimus inaccuracy.

### Interest-Sensitive Policies

INTEREST-SENSITIVE POLICIES WILL offer a new challenge. They must have their reserves calculated by

policy every year according to the credited rate history and any other changes in nonguaranteed elements. Many companies already have a program that does just this. But if not, a macro in Excel or Lotus 123 can do this simply. The policy reserving logic should be well understood so the spreadsheet can do this nicely. A more complex, but elegant solution is to tap into Access's VBA (Visual Basic for Applications) capacity to do the interest-sensitive reserve calculation. While this does have initial attractiveness, readers will know from experience that elegance may not be practical and functional.

Running a spreadsheet macro won't be fast, perhaps taking over an hour for a large block (a small company's large block). On the other hand, it is transparent. With the speed of machines increasing as it is, next year the one hour will be closer to one-half hour, then one-quarter the following year. The major benefit is that the actuary *knows* what is going on in the calculation.

### Now for the Queries

THE OUTPUT OF THE interest-sensitive spreadsheet or program is a table that can be dropped into Access and tied to the policy master file. By proper definition of the joins (these define relationships among tables in a relational database),

the reserves are associated with the appropriate record. Though each company will have its own unique needs, this method should allow for each policy to have a reserve associated with it. The non-interest-sensitive and interest-sensitive reserves are associated with their records at the same time in this step.



This step is also the time to add in the 41 CSO mortality rate or any other mortality rates of interest for experience studies. Experience says that this step is the query of data from another query of other data from yet another query. These earlier queries are simply getting data into

the form needed for this latest query.

For example, duration may not be in the policy master file, so a query is used to find the duration that is used in the next query for finding attained age for the mortality table association(s). Or the duration is used for finding the correct reserve factor.

Once this latest step is completed, it is suggested that instead of continuing to use a select query (a MS Access-specific term), it is time to run a make-table query (another Access-specific term) that is the "stamped" table from which all the Exhibit 8 numbers are generated. This table now has data integrity at the highest level in this process and all associate factors with each policy master record, e.g., reserve factors and mortality  $q_x$ .

It can be helpful to establish a network directory in which to place the results of the various queries. These can be quickly accessed to bring the data into spreadsheets set up specifically to produce financial reporting exhibits.

### Other Uses of Desktop Databases

NOT ONLY CAN PERIODIC financials be generated quickly and easily through desktop databases, experience

studies become very efficient and can be quickly viewed by any slice and dice desired. Perhaps these views are already available in 10 binders in hard copy. A desktop database allows trees to be saved and rent for storage to be pocketed, all the while permitting new views of the data without the two-day or two-year lags caused by IS schedules and priorities.

Large tables of medical claims are summarized without difficulty, including adjustments for deductibles, coinsurance, and reinsurance. An Access cross-tab query even puts the data in a paid month-incurred month grid. By differencing the paid and incurred months to find the claim payment lag, the cross-tab query can generate the incurred month-to-payment lag table.

In a more complex application, long-term care insurance claims were compared to expected claims. The resulting actual-to-expected study was able to look at experience by policy form, sex, age, duration, elimination period, benefit period, state/region, and general agency to mention several. This application required VBA to calculate the expected claims cost by duration for each record.

While Access does not work just like Excel, it is straightforward to learn. One user had need to calculate PUAs due to a non-Y2K compliance issue. Access provided a low cost alternative to reprogramming the mainframe and the added potential benefit of handling all financial reporting requirements as discussed above. The initial PUA work was an ideal training ground for the larger project.

With the power of today's software tools, it is often only a matter of the actuary finding the right tool to increase his or her productivity beyond what was believed possible.

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