

Sources and Characteristics of Mortality Tables

by James A. Keeney

**Story Submitted for the
10th Speculative Fiction Contest**

**Sponsored by
Society of Actuaries
Actuary of the Future, Forecasting & Futurism, and
Technology Sections**

© 2013 Society of Actuaries, All Rights Reserved

The opinions expressed and conclusion reached by the authors are their own and do not represent any official positions or opinion of the Society of Actuaries or its members. The Society of Actuaries makes no representation or warranty to the accuracy of the information.

Sources and Characteristics of Mortality Tables

By James A. Kenney

Al Payano frowned at his screen. Something was wrong with his data, *very* wrong. He had smoothed it, graduated it, interpolated it, used the Newton-Raphson approximation, but nothing had helped. There it remained, like acne on a teenager: an inexplicable spike in the death rates at age 30. It wasn't a *big* spike, Al tried to tell himself, barely three-hundreds of a percent, but given the low mortality rates at age 30, it seemed to tower over its neighboring age cohorts like the Eiffel Tower.

Al believed in data. He believed in data the way a reformed alcoholic believes in a Higher Power. Life was illusive, messy, and confusing but data was real, data was orderly, data made sense. Al put his faith in Credibility Theory; his soul found solace in statistical significance. The Law of Large Numbers meant more to him than any merely human laws. Al was working with millions of deaths, billions of life-years of exposure, and with numbers like that he should have been looking at a beautiful, smooth curve. Instead he was looking at a mess. Al did not like messes: they offended his sense of symmetry, they threatened his security.

Okay, there's got to be an explanation, he thought to himself. Errant data spikes didn't just crop up out of nowhere, not with this volume of information. There had to be a reason, and the most likely one was some kind of a programming bug. Al groaned. He hated scrolling through lines of code, looking for a misplaced comma, a hard-coded number that was out of date, a faulty key-stroke. This code was solid. He'd used it before. He'd written most of it himself. It always worked. But Al was enough of a programmer to know there was no such thing as perfect software, not at the level of complexity involved in developing a new mortality table.

George wants this next week! He reminded himself. *I promised it to him next week.* Al gazed at the screen with growing irritation. *Look at the rest of the curve: smooth as bunny's fur. Just that one anomaly at age 30.*

It had to be a bug in the code. The data had been submitted by the largest life insurance companies in the country. This wasn't some dime-store operation: it was the biggest mortality study ever conducted. The data didn't come any better. It had to be the code.

At eleven twenty-three that night, Al came out of a trance, his eyes burning. He was surprised at how dark it was in the actuarial department, how quiet. *Oh, my God, Meredith!* He thought frantically. *It's our month-aversary! We have a dinner reservation for eight!* He looked at the clock. *She must be really...*

It was too late to call her now. He looked helplessly at the phone, as if it could save him. He'd have to explain it to her tomorrow, apologize, tell her he'd had a problem at work. She'd understand. She was a lawyer. She worked late herself. Of course she'd understand.

The way Becky understood? Al asked himself. Or Margo?

He glanced back at the screen, at the last few lines of pristine code he'd just spent five hours reviewing. The code wasn't the problem. The code was just fine. He clicked his mouse and the program disappeared, leaving that impossibly marred curve to mock him.

Why did he have so much of a problem with women? He wasn't a bad guy; he was considerate, even romantic. Okay, he had a tendency to forget things when he was under pressure at work. Which was all the time. George wasn't easy to work for, George wasn't considerate or fair, all George cared about was results. George wasn't even an actuary; he didn't appreciate what was involved. George was a political appointee, and he kept talking about "the Senator wants..." , "the Commissioner needs..." , "I promised the Secretary of the Treasury..."

Al hated George. George didn't **care** whether the results were right. All George cared about was whether they looked right and whether they were on time. All George cared about was his reputation, all the little favors he was piling up for himself, for his future career. Fortunately George didn't care that Al hated him, since Al wasn't very good at hiding it. George was used to people hating him. He was a politician.

Al looked at the computer screen again. The rest of the curve was perfect. If only he could just eliminate the anomaly at age 30, just wipe it out and replace it with what was the obviously right answer. Who cared how it got there? George certainly wouldn't.

It was undeniably tempting, but Al was too much an actuary to do anything like that. An accountant might have; George would have. But to be an actuary was a Calling, a profession in the old-fashioned sense of the word: a statement of faith. Faith in meaning, faith in order, faith in truth. Faith in data. If the code was right, and the data was credible, then that anomaly meant something. Al had no idea what it meant, but he also had no doubt that it meant something.

Data does not lie, he recited his creed, and forgetting all about Meredith, all about their month-aversary, all about the darkness of the sea of empty desks around him, Al settled down to find out what it meant.

Five hours later, he had isolated the problem, if not solved it. The answer he had found was incredible, difficult to believe, but he had the data to prove it. He just didn't understand, couldn't comprehend the fact he had discovered.

Every single person born on September 17, 1998 had died within a week of their thirtieth birthday! One hundred percent mortality. Exactly enough to explain the excess mortality on his screen. He sighed with relief. There had to be an error somewhere. Somehow when the data was being compiled, a programming error had generated spurious dates of death for anyone born on September 17, 1998.

He wondered at what stage the spurious data had been created. It couldn't have been the insurance companies. There were too many for them all to have made the same mistake. It must have happened when the data had been merged. Tomorrow he'd talk to the head of the data-integration team.

He glanced at the clock on his screen: 4:37, it showed. It was too late to go home. He'd pulled all-nighters before. He even had a blanket in his lowest desk drawer for such occasions. He could stretch out on the floor next to his desk and catch a few hours before his co-workers began to arrive.

At nine o'clock Al was back at his desk, feeling much better. The actuarial department didn't rate a shower, unlike the executive suite on the 89th floor, but Al had gone across the street to the YMCA as soon as it opened and had taken a sauna and then a shower. He was even wearing a clean shirt and socks from a supply he had stashed in his locker for just such contingencies. With great trepidation, he called Meredith, but luckily got her voice mail instead. "Honey, I'm so sorry, I just ..." *what, forgot our date?* "I'm up to my eyeballs at work and I'm behind on my big project and I..." *went into a trance?* "lost track of the time. I'll make it up to you this week end, tomorrow, how about we make an afternoon of it and go to the Museum of Modern Art?" *what am I saying, she hates modern art!* "...or something, whatever you want, I feel like such a fool for missing our dinner, so whatever you'd like to do. Love you! Call me."

Was she doing something, he wondered, or had she looked at caller ID and deliberately not taken his call? *I am such a schmuck with women*, he thought to himself, but he knew it wasn't for lack of trying, well not entirely for lack of trying. He just didn't understand women and was a little scared of them. Love was messy, and women didn't give you information, they gave you *hints*. "I want to do X at time Y at place Z," Al could handle, but, "Do you want to do X? What's a good time for you, Y? I've heard place Z is nice," required considerable decoding before Al realized the two sentences were identical.

At least he'd called her, and even though he felt cowardly for leaving her a voice mail apology, it would give her a chance to calm down so he could apologize in person.

"Al!"

It was George, strolling in at 9:15, as usual. Al considered George a slacker as well as a slime-ball.

"Hey, George, how's it going?" Al replied.

"Just what I was going to ask you, buddy! How's my new mortality table coming? Is it ready for the boys on the 89th floor yet?"

“Actually, George, I’m having a little problem and…”

“Just as long as it’s ready on Monday,” George said breezily.

“Monday!” Al howled. “You said next week!”

“Monday **is** next week,” George smirked. “You’re my boy wonder, my secret weapon. I’m counting on you, Al! I told the President of Transamerica Metropolitan Continental I’d have it for him Monday afternoon. The NAIC is crawling all over my ass. This table’s the biggest thing since Jesus. They’re going to use it for pricing, or reservations, or something, anyhow, something important, so it’s got to be Monday.”

“But I’ve got a problem!” Al squeaked.

“You’ve always got a problem, Al. That’s not the right attitude. The right attitude is, ‘What do I need to do to get this to George on Monday?’”

“But today’s Friday!”

George smirked again. “That’s what weekends are for.”

“But Meredith, my girlfriend, our month-aversary…”

“She’ll understand. Just tell her your job’s at stake.”

“I missed our month-aversary last night! I was here all night! I can’t work all weekend too!”

George looked suitably concerned. “Well, let’s have a look at this ‘problem’ of yours. I’m a pretty good problem-solver, you know. That’s why I’m boss of the actuarial department.”

No. it’s because your brother-in-law’s cousin is head of the NAIC.

Obediently, Al brought up the curve.

George whistled. “Sweet!” he exclaimed. “They’ll like that! All except this little thingy here. What’s that doing there?”

Al sighed. “That’s the little problem I told you about.”

George smiled. “Hell, that’s no problem. It’s obvious what the right answer is. Just get rid of that one point and plug in the right number and you’re done! You don’t even need until Monday. Just make that change and email it to me by noon. Today! This’ll look great, believe me. Just do it!”

Al bristled. “I can’t just ‘do it’, Mr. Anthony. I have to have reasons. I have to investigate. I have to find out the source of the problem.”

“Why?” George smiled, slightly puzzled, as if he really didn’t understand why Al would object to such an obvious solution.

“Because. That’s what actuaries do. We’re objective. We pay attention to discrepancies in our data. We find out why they exist. There’s something very strange here.”

George shrugged. “I need it Monday. At *noon* on Monday. If you have to stay here all weekend, that’s your problem. But if I were you, I’d just get rid of that thingy and plug in the right number and send it to me today. Don’t forget, your review’s coming up next month.”

Without waiting for an answer, George turned and headed for his office.

God, I hate that man! Resentment boiled in Al’s veins. He picked up the phone and called a friend at Lincoln Jackson American International Group.

“Jeremy,” he said when his friend answered. “I’m working on the new mortality table...”

“I thought you were all done with that,” Jeremy said. “At least that’s what your boss is telling everybody. We’re supposed to get it on Monday.”

“Well, I’ve got a little problem,” Al began.

“Don’t we all?” Jeremy laughed. “I bet your problem starts with ‘G’.”

“Don’t get me started,” Al warned. “Look, there’s something funny with the data you gave me. I keep getting this bump in my Qx’s at age 30 for people born on September 17, 1998.”

“Stop!” Jeremy interrupted. “Stop right there.”

“...and I keep getting a Qx of 100%...”

“I can’t talk about this,” Jeremy said.

Al glared at Jeremy’s face on his screen. “What are you talking about?”

“Gosh, look at the time!” Jeremy said. “Nine-thirty already! I think I’ll take a little break now. Got here at six, you know. I think I’ll head on over to Starbuck’s and get a non-fat latte grande. See you later, Al.”

Before Al could object, the picture blinked off and the phone went dead. Jeremy’d hung up on him! But when he thought about it, Al realized Jeremy had been trying to tell him something. Starbuck’s was just a couple of blocks away. Al glanced anxiously at George’s closed door, grabbed his jacket and ran. A latte grande sounded just like what he needed.

Ten minutes later, the two friends were huddled over a ridiculously tall table in the corner. “Look, Al,” Jeremy said. “You **can’t** talk about September 17th.”

“Why not?” Al demanded.

“Some kind of national security thing.” Jeremy looked around anxiously. “Look, I shouldn’t even have sent you that data, but I didn’t know then, so I’m going to have to ask you to purge it from your files.”

“I can’t do that!” Al shouted, and Jeremy kicked him under the table. “I need that data for my study,” he said more quietly. “Lincoln Jackson American International Group is our third largest contributor of mortality statistics.”

“Just the data for...that date.”

“What’s going on, Jeremy?” Al asked.

“Just delete that data, okay?” Jeremy glanced at his watch. “Well, break’s over. Nice seeing you, Al. We ought to do this more often.” Jeremy made a nice toss of his cup into a trash receptacle. “You know, I can’t speak for Transamerica Metropolitan Continental, or any of the others, but I bet your mortality problem will just go away if you eliminated certain data and replaced it with expected mortality instead. That’s what I would do, if I were you.” With a final look around, Jeremy put on his coat and walked off.

National Security? Al wondered as he headed back to his office. *What's September 17, 1998 got to do with national security? That's September 11, 2001, not September 17 1998.*

But Jeremy had certainly seemed, well, frightened. Suddenly Al felt a little frisson of horror. *Delete your data?* Al couldn't do that. Jeremy knew he couldn't do that. Al could be brought up before the ABCD. Jeremy was his best friend. Why was his best friend telling him to do something unethical?

Just to see what would happen, Al made another copy of the mortality files, only this time he removed all deaths for people born on September 17, 1998, and as Jeremy had suggested, replaced them with expected mortality based on an average of ages 29 and 31. He ran his table-creating program and a perfect curve appeared on his screen. *Now **this** is what a mortality curve should look like!* He thought exultantly.

All I need to do is email this to George, he thought suddenly. Everybody would be happy: the insurance companies, the bureaucrats and most importantly, his boss. The curve was so obviously right, no one would ever know a little bit of data had been...tweaked, Al rationalized. With scarcely a second's hesitation, he hit "print" and began composing his email. "Dear George, Attached are the final Qx's for the mortality study you asked for. Thanks for your help this morning. You were right: it was just a silly data error. When I fixed it, everything was fine. I've deleted the old data from the system so no one gets confused about which is the right file. Al."

I can't believe I just did that, thought Al in a daze. Carefully, covering the motion with his body, he copied the old file onto a data wafer, and then purged it from the computer. He glanced up at the security cameras, but he was sure the angles were all wrong for them to have captured what he had done.

All day he felt everyone staring at him, at the data wafer in his left pocket, especially when George came out of his office and bragged about his "boy wonder" to all the other actuaries, as if Al was Robin to George's Batman.

As usual, George left around three o'clock, to "go talk to the guys on the 89th floor," though the elevator button he pushed said "down". Ten minutes later, Al followed him out.

I can't do this on my home computer, he thought. Briefly he considered Meredith, but he didn't want to drag her into any national security data breach, if that was what this was, and besides Al had a feeling she might not be overjoyed to see him after last night, especially if what he wanted to do was use her computer to examine some data. Where could he go? Not the library: they kept records. A cyber café? There were several nearby, but suddenly Al felt paranoid. What if they kept track of everything anyone did? There were those secret cyber-subpoenas under the new Patriot Act. At least he assumed there were; no one knew for sure, since those parts of the Act were classified.

What am I doing? Al wondered. *I should get rid of this wafer right now!* But he knew he couldn't. The mystery of September 17, 1998 had him in its grip, and he couldn't stop until he solved it. It wasn't a data glitch, he was sure of that. Not after that latte grande with Jeremy. It was real; horribly, terrifying real: 20,000 excess deaths, all among people born on a single day.

Meredith's was out; cyber cafes were out, Jeremy's was out. What did that leave him? Twenty minutes later, at the Elite Electronic Emporium, Al surreptitiously slipped his data wafer into a cheap computer. There were too many pre-Christmas shoppers thronging the Emporium for a salesman to waste his time on Al. Quickly, he skipped through his data, discarding everything but people born on September 17, 1998. That done, he turned quickly to the meat of it: cause of death.

That had to be it, and it was. Twenty thousand cases of heart failure, all at age thirty, give or take a few days. It covered everyone. They were everywhere: Chicago, New York, LA, Atlanta, Houston, even a little bitty place called Bellevue, Illinois. What could possibly have caused them? Why only that one day? Why age 30? And what did this have to do with national security?

"Excuse me, sir," a man said. He didn't look like a salesman. He looked more like a security guard. And there was another man behind him. *Oh, shit!* thought Al.

“I don’t think this computer is what I’m looking for after all,” Al said dismissively and stood up. He left the data wafer in the machine. “I’m looking for something with a little more oomph for my nephew. He’s in high school and his laptop just doesn’t cut it anymore. Can you show me something a little more up-scale than this?” He gestured contemptuously at the device.

“If you’ll come with me, sir?” the man said.

“Sure,” Al said easily. “I’m looking for something under two thousand, plenty of RAM, one of those noventium chips, and good speakers, he loves music, and oh, Office 17 and uh Photo-shop...”

The man took Al’s arm. Al looked at his watch. “Oh, look at the time! You know what, I think I’d better get this tomorrow. Gotta hot date, Friday night, you know,” he babbled. The grip became tighter.

“This will just take a minute,” the man said, dropping the “sir” this time, and the second guard took Al’s other arm. *I should have listened to Jeremy*, Al thought as they led him toward a door on the far wall.

“Mr. Payano?” the man seated at the table said. He nodded at the two guards, who released Al and retreated from the room. The man clicked on a mini-recorder.

“What is this?” Al said defiantly. “I was just trying to buy a computer for my nephew...”

“...violation of section 1532(j) of the Patriot Act...” the man was saying.

“What?” Al replied.

“...to remain silent...”

“I haven’t done anything!”

“...be used against you.” The man concluded. The room fell silent. Al looked at the grim face across from him.

“I want an attorney,” Al said firmly. He’d read enough detective novels to know that talking to the police without an attorney present was a *big* mistake.

“Under Section 1532(j), you do not have the right to an attorney,” the man said. He reached forward and turned off the recorder. “You are Albert Payano, employed as an actuary by Towers, Price, Ernst and Buck, correct?”

Al nodded.

The man pulled a little box out of his coat, pointed it at Al, and pressed a button. Al’s every nerve tingled, grew hot, exploded. He slumped forward in his chair. The man looked at Al’s body for an instant. *Damn that test on September 17, 1998*, the man thought bitterly. It had just belatedly claimed another victim. *Quantum Fission Dampening Field, my ass*, he thought. Nuclear fission hadn’t been inhibited at all; instead, a bunch of mutants had been created. He looked at the hapless actuary, lifeless on the table. Another sacrifice to keeping the secret of a monumental screw-up. Sometimes he hated his job.

The man pulled out his phone and pushed a key. “I need an ambulance!” he screamed with false urgency. “Looks like the suspect had a heart attack, or something. Quick, get me some help!”