What is a "safe" medical condition?

One Pilot's Decisions

Wilbur Hurley, some years ago, found himself sitting, bare butt on the crinkly clinical paper covering his doctor's exam table, pondering his own self. His wife, Betty, had quietly told him that his energy seemed down, and she'd made an appointment with their doctor for a physical, and here he was, opened for inspection.

She didn't have to point out that his pulchritude had evolved into portliness as his chest had slowly migrated into his drawers – this was obvious in the mirror. Or that his dreaded fiftieth birthday was a half-decade in the rear-view mirror, the days of his life clicking by with steadily greater alacrity. The great trees of his life were gone: his mom had had diabetes; his dad, a heart attack, and he figured that he, the round ruddy apple, had dropped into the grass beneath them.

His pilot medical was soon to expire. He had a hair over 300 hours in his log, and five years ago had joined two friends in a partnership in a nice old Cherokee. Partly, this exam was to make sure he'd pass his medical.

After the indignities were done, and Will had dressed, Dr. Payne handed him a piece of paper arrayed with clinical numbers, and soberly said. "Your blood sugar is up, Mr. Hurley. Google *characteristics of metabolic syndrome*. You've got the beginnings of diabetes." That wasn't the whole conversation, but the condemned man remembers only the noose.

Therefore, Wilbur sold his share of the Cherokee, and after the grief had ebbed, joined a local gliding club. He could have lost the extra weight, and exercised every day, and gotten rid of the diabetes, but that would have meant conflict with his wife, and his own appetite, about food; and he hated getting short of breath and sweaty. Besides, work made him too tired to exercise.

One of his friends told him about soaring, and brought him for a ride at his club. No medical needed! Life was good. He joined, got his rating. He bought a lovely used 15-Meter glass ship, and enjoyed flying little triangles over the prairie farmland west of the city, and giving the occasional ride in the club two-seater. As the years went by, he became pretty good at soaring.

Medical Issues Accumulate

As the years went by, he and Dr. Payne became better acquainted. There were medications for cholesterol, and for blood pressure. One winter, he noticed that he seldom awakened rested, and had to fuel himself with coffee to work effectively. Dr Payne said, "Google *obstructive sleep apnea*," and sent him off to a specialist. He flunked the expensive test; and Betty had the pleasure of not being any longer kept awake by his snoring – and the annoyance of sleeping next to a softly hissing monster wearing an elephantine snout.

He started to have some trouble with focus and distractions; Dr. Payne said, "Google *adult attention deficit disorder*" and put him on amphetamine. Increased work stress caused anxiety, and Dr. Payne prescribed clonazepam. His diabetes, as happens to everyone, got slowly harder to control during the six years after it was diagnosed, so eventually he was taking two medications for his diabetes, glyburide twice a day, and injections of exenatide twice a day. Control was imperfect, but Will was determined not to go on insulin. He had some chronic back pain, but acetaminophen was usually enough to handle it. ☛

In six years, Will had put over 500 hours on his ship, and over 600 flights. Lots of flying for a guy with a full-time job! His flights were often short because he didn't wait for the best weather, didn't care whether he spent all afternoon making a big triangle, though he'd done his share. If he had the afternoon off, and there was tow, he flew.

Then, one sunny Sunday afternoon, Will took a tow; released at 1500 AGL, thanked the driver, and wasn't heard from again. Folks were worried – his aim was only to fly locally; in fact, lift was mostly weak and hard to work. After he'd been gone an hour, and didn't respond to radio calls, three airplanes began a search and found the wreck in a cornfield shortly before sunset.

The autopsy showed the crash had killed him, severe head and chest trauma. His broken flight recorder had to be rebuilt; the recovered record showed that the gilder had climbed about 2000 ft off tow within 15 minutes, and afterward made a series of turns without gaining altitude. In about a half hour, it crashed while in a descending left turn.

Medical Analysis

Nothing is more obvious than that Wilbur became incapacitated, probably unconscious, before he crashed. A pilot aiming to commit suicide dives into the ground or a feature. A pilot who is conscious and can move will try to land.

The Counsel for the Prosecution. Should he have flown that day? For that matter, should he have been flying at all, with his medical conditions and his medications?

First, let's beat up his decision to be a pilot, and to fly. What right did he have, in his condition, to be at the nether end of a tow rope? (I speak here on behalf of tow pilots.) Let's use FAA medical certification as a touchstone of safety. Even though soaring pilots don't need a medical certificate, the FAA standard is public, well understood, and carefully established.

His diabetes and sleep apnea are both disqualifying conditions. (Special issuance is available for both of these if the pilot is able to present evidence of good control and lack of significant adverse effects.) We don't know whether Will had adverse effects of either condition that would make him a danger. Regardless, the burden is on him to confirm that there are none.

Two of his medications are absolutely disqualifying: the amphetamine and the clonazepam. The FAA will certify no pilot who takes either medication, or any other medication that impairs brain function. Strangely, they seem to believe that pilots' brains should be engaged and at full throttle.

Without going into detail, there are two issues right here: one is that ADD is sometimes associated with defects of planning, organization, or clear thinking. The FAA will certify a pilot with this only after a battery of neuropsychological testing has demonstrated no significant impairment (in fact, most commonly the diagnosis was applied loosely). The other is the medication. Yes, military pilots use these to combat fatigue. However, this use is in situations of war fighting, where the mission must be done regardless of fatigue, and amphetamines decrease the impairment from exhaustion. That it strikes an acceptable balance in war does not mean the risk is acceptable in recreational or commercial aviation.

Second, clonazepam is a benzodiazepine, related to Librium and Valium. As a patient said about one such drug 30 years ago, "Doc, that's just a cheap drunk." They all impair mental performance, and do so for many hours after the dose. I really don't want my check ride pilot to have recently taken any of these. Perhaps he understood this and managed this medication appropriately. It's his responsibility. I've heard people say, "I function better with the medication than without it," but I've heard people say this about their drinking, too.

Next, one of his diabetic medications, glyburide, carries a significant risk of hypoglycemia by stimulating, not entirely related to need, release of insulin from the pancreas. Might Will have been in diabetic hypoglycemic coma – naw, he had a full stomach at autopsy. Diabetes can also impair their minds through high blood sugars. But this doesn't occur suddenly, and usually occurs with disabling illness. Will hadn't seemed sick to others at the airport that day.

Will had obstructive sleep apnea. This causes daytime sleepiness that may not be completely relieved by CPAP (etc.). It's possible that he may have gone to sleep in the air. Some people have motion-induced drowsiness as their own form of motion sickness (Google *sopite*

syndrome or recall that we rock babies or take them in the car to put them to sleep). This would augment the consequences of sleep apnea. We can't exclude this as a possibility, but we also can't know whether this may have happened.

Last, diabetes substantially increases the risk of heart disease and stroke, especially for smokers: most diabetics – about 80% – die of heart disease. Will surely could have been incapacitated by a stroke, a seizure, a heart attack, or by a cardiac rhythm abnormality. The fact that his autopsy showed neither a stroke nor a heart attack does not mean they did not happen, because he died within just a few minutes, before any detectable tissue damage would have occurred. In any case early tissue damage would have been obscured because his body was found five hours after death, in 90-degree weather.

It's my medical judgment that he most likely was made unconscious in-flight by an unanticipated cardiac event or less likely, a stroke, or seizure.

The Rule: *FAR 61.5 – For operations [not requiring a medical certificate]..., a person shall not act as pilot in command, or in any other capacity as a required pilot flight crew member, while that person* ***knows or has reason to know*** *of any medical condition that would make the person unable to operate the aircraft in a safe manner.*

What does this paragraph mean? We pilots are grateful for the liberty it grants – but to anyone injured by our accident – our unplanned, unanticipated catastrophe – the words "have reason to know" and "safe manner" will have different meaning after our "should I fly" decision than they meant to us while we were gazing hungrily at the high flat cu drifting majestically across the gliderport.

If our arms are broken, we obviously are unable to operate – but if we *feel* OK physically and mentally, the "operate in a safe manner" idea is purely *relative risk.* Part of the decision to fly involves who and what is at risk. Flying our own self-launching glider solo is different from being towed by our best buddy, in the club two-place, with our first grandchild in the front seat.

There is no bright line. This decision tests our judgment and discretion; and we will be retrospectively condemned if we have any incident while having a medical condition that might have contributed. With an incident, the risk suddenly goes from hypothetical to 1.0, and friends, family, the NTSB, and the victims will question our judgment.

Now, the difference between the FAA granting a medical certificate and the soaring pilot deciding on Sunday whether to fly is this. In granting a medical certificate, the FAA is saying there is *evidence* that the pilot is *unlikely* to experience sudden in-flight incapacitation *for the duration of the certificate.* It's a legal process, not merely a medical one. The soaring pilot has to look ahead only for the duration of the flight, and can take into account the specific demands and risks of the aircraft and task.

Now, we can't know whether Wilbur personally (based on his own education) *knew* that he was likely to be impaired during that flight. Yet this collection of medical problems means that he *had reason to know.* Though he was not a doctor, he didn't need statistics to figure out the potentials here, especially with

such a combination of risky conditions and medications.

Now, as the second phase of this discussion, let's look at his decision as a reasonable one, for I'd like to think that Wilbur did as you or I would have done, trying always to weigh risk and recreation in a just balance.

The Counsel for the Defense

I'm willing to defend his decision to fly, based on risk and consequences.

- He was not terribly old, not quite ready for Social Security, barely old enough to draw down his 401(k) if he wished. I'm older than he was, and I don't expect to go into a coma while flying my glider any more than he did.
- He was flying solo: he put no one else at risk after the tow was finished.
- He was flying his own glider: the financial and liability risk was his own, and that of his estate. Presumably, he had insurance to protect his wife from the financial and legal consequences of an incident.
- He was flying in a farming area, which greatly reduces the risk of crashing into an occupied building or vehicle.
- As a doctor, I strongly doubt that his physician had frankly outlined the risks to pilot performance of his diabetes or his sleep apnea, or the effect of any of his medications on pilot performance. Most doctors don't have the time to do this, and even most AMEs know the rules rather than the data. Thus, I doubt that he actually knew or had reason to know he was at relatively high risk for something like this.
- He died prematurely, but peacefully, doing something he loved; not after being warehoused for years in some nursing home, kept expensively and miserably alive by Modern Medicine.

Risk is Situational, but Gets Personal Quickly

The Brain is a Useful Organ to Pilots! It's a good idea to stay on the ground if we're taking medication that alters brain function, or if we have any medical condition that carries a well-understood risk of sudden incapacitation. Ask your doctor for a specific recommendation, if you have diabetes, undefeated cancer, or any heart, lung, brain, or circulatory condition. Please.

Here's the deal. Suppose you know that you have a medical condition that has, for example, a 1 in 75 risk of sudden in-flight incapacitation that comes without warning and is unpredictable. Now pretend that you are offering your best friend a ride in the two-seater. "Kim, I might pass out, but it's only a 1 in 75 chance, and I'd like you to take a ride with me. Soaring is so wonderful! Whaddaya say?"

Right. Truly informed consent can be sobering. What would she say after knowing the precise risk, about taking the ride? If you're flying solo, don't you think your decision should be the same, for yourself? For your family? We'd all rather die, unconscious in a crash, while enjoying the delights of soaring, as did Wilbur, than fade miserably away after a half-dozen years warehoused in a nursing home. But that isn't the choice for 90% of us.

A difficulty with this is that we can never know exactly what our risk is. It is true that a small number of pilots, every year, have a seizure or sudden death during flight. How predictable is this?

Probably the highest risk of sudden death is in people with badly damaged hearts – "congestive cardiomyopathy" – in which roughly 20% have sudden death each year. As there are 8760 hours/year, this presents an absolute risk of 1 in 4380 for any two-hour flight. That's two one-hundredths of one percent risk of death for each flight. This is why high-risk pilots get away with it: even relatively common risks are unusual. It's not like the risk of catching a cold while playing cards with someone who has one (60-90%, depending on how sanitary he is with secretions). At the same time, if this pilot is quite active – say 100 hours per year, now it's a 2% risk of dying during a flight at some time. Most people are troubled by this 1:50 risk.

Wilbur didn't have this condition; but as a diabetic, he surely had ischemic coronary artery disease. In addition, about one person in six who has undiagnosed heart disease discovers the condition by dying suddenly.

How to judge.

If you have a condition, ask someone else! Make the situation hypothetical: "Jerry, I know this pilot who has (e.g., an acoustic neuroma. It makes him dizzy sometimes). Would you fly with him?" Then listen to Jerry's concerns.

Laymen are ignorant, especially when they think they're not. Nevertheless, everyone is educable. Ignorance is expected; failing to fix that is stupid. However, my experience is that individuals typically underestimate or overestimate wildly their actual risk (according to their proclivities and attitude), and almost never understand their altered physiology; and even laymen have pretty good judgment regarding what *others* should do, so getting counsel from others is generally useful.

Doctors can be helpful about how the medication or the condition might affect us adversely, but very few doctors understand the demands of flying, and are thus generally unhelpful in making a specific decision about flight.

We all would say, "If you feel subpar, don't go." Yet the most serious forms of sudden in-flight incapacitation strike us when we feel well, suddenly and without warning: seizure, stroke, many heart attacks, and fatal cardiac arrhythmias.

Now, think about that unacceptable 1:75 risk a few paragraphs back. No one can truly quantify risk.

In reality, as we face the 'should I fly' decision, we only know there's definitely a risk, given our medical status, or there's no identifiable risk. Each of us must bear this in mind: if we know there *is* a reason that we might have an incapacitating event like a seizure, a stroke, diabetic reaction, heart attack or sudden death while we're flying, do we have the right to put another person's life in jeopardy without confessing this and explicitly getting permission? The tow pilot's? Our passenger's or student's? The folks in the houses and vehicles down below?

None of us has the right to put others at risk. It's the law, it's considerate, it's fair.

Note: Pulchritude means "that quality of appearance which pleases the eye; beauty; Omeliness; grace; loveliness." Moreover, thanks to Paul Kram, who generously beat up the first draft.