Transcript: Could this mathematician's formula fix U.S. hospitals?

Dan: Hey there. Mark Taylor is a reporter, and when he started covering health care in the 1990s, the beat wasn't his first choice.

Mark Taylor: I thought it was a punishment. I thought, I don't know anything about healthcare. I was bad at science, I was bad at math. I didn't understand any of this stuff, but I just was determined not to fail at it. And I dove into it head first and my wife said, you know, you used to read novels in bed and now you're reading the CDCs mortality and morbidity report.

Dan: About twenty years in, he picked up some medical journals -- like you do -- and looked at some studies about work by a guy named Eugene Litvak.

Mark Taylor: I started reading these and going, wow, that's a good story.

Dan: Litvak was a math PhD, with a background in operations management, systems engineering. He'd spent the first chunk of his career making telecommunications networks more efficient and reliable.

Many years later, One hospital that had implemented Litvak's program had saved more than a hundred million dollars a year.

But the results were about more than money. Mark Taylor kept reading...

Mark Taylor: Reduces mortality rates in-hospital. That's a good story. Improves nurse retention. We've got a nursing shortage. Reduces waiting times in ER and patient boarding.

Dan: Patient boarding sounds nerdy, but: We talked about this a couple of episodes ago, when we looked at the new HBO/Max medical drama "The Pitt."

When hospital ERs get crowded -- and way less effective -- it's generally because of crowding upstairs.

ER patients who need a bed upstairs can't get one, so they wait in the ER. And clog it up. Wait times get longer. Medical mistakes happen. People die.

On "The Pitt," and in lots of hospitals, this gets treated as a fact of life.

Hospital administrators say they can't afford to build the new wings or hire extra nurses to meet peak demands.

But Litvak's work showed: They don't need to.

Because -- it turns out -- random ER visits don't cause those peaks.

Scheduled surgeries do. They get bunched up on certain days. Un-bunch them, and the peaks get smoother.

Nurses and doctors get less burned out. Fewer patients die. Hospitals waste less money.

In other words, Litvak's work addressed some of the biggest problems Mark Taylor had been writing about for decades.

Mark Taylor: There's a solution here. It's been proven to work, and it's been validated in the best medical journals in the country and in the world. How come this isn't in every hospital?

Dan: That was ten years ago. It's still a good question.

Mark wrote some newspaper stories about Litvak's work, starting with one in the Chicago Tribune, and eventually started working on a book.

It came out in 2024, and it's called "Hospital, Heal Thyself: One Brilliant Mathematician's Proven Plan for Saving Hospitals, Many Lives and Billions of Dollars."

By the time Eugene Litvak started working with hospitals, he was in his mid-40s. He had grown up in the Soviet Union, where he earned a PhD in math and worked as a systems engineer.

His career there came to a halt when he asked for an exit visa -- and his request was refused for almost a decade. There was a word for people in that predicament, lots of them, like Litvak, Soviet Jews: refuseniks.

Eventually he got to the U.S. -- where he's now spent decades trying to get hospitals to try his methods.

Eugene Litvak: **I recently started telling people that I am a double refusenik, for 10 years refusing for the exit visa in Soviet Union, and now for 25 years in healthcare decision makers.**

Dan: He's not giving up any time soon. And he thinks eventually hospitals will come around. He thinks they're gonna have to.

This is An Arm and a Leg-- a show about why health care costs so freaking much, and what we can maybe do about it. I'm Dan Weissmann. I'm a reporter, and I like a challenge, so the job we've chosen here is to take one of the most enraging, terrifying, depressing parts of American life, and bring you something entertaining, empowering and useful.

Eugene Litvak was born in Kiev in 1949. Mark Taylor reports in his book that Eugene Litvak's work in engineering and math attracted international attention in the 1970s.

Litvak also faced frustrating obstacles. A controlling boss. Semi-official antisemitism.

But what finally spurred him to try to leave the Soviet Union was an offer. From the secret police-- the KGB.

Eugene Litvak: **And they were so nice, you know, like you're talking to your long lost brother. They said, you have a lot of friends. You communicate with many people. How about you work for us?**

Dan: Eugene says the offer terrified him. Because he knew immediately he couldn't accept it.

Eugene Litvak: **I would not be any longer in peace with myself. In addition to that, I can tell you my father probably would stop talking to me if he would learn that I did something like that. So, these two factors – look, I didn't think whether I should accept it or not. I didn't think about that. The only thing that was immediately in my mind– how can I avoid it to minimize the consequence for myself?**

Dan: As he told Mark Taylor, he didn't face immediate consequences for declining, but he knew he'd always be at risk. He and his wife decided to leave.

As they expected, they got fired from their jobs the day they applied for exit visas.

He says they were prepared to wait out a process that they figured would take months, maybe a year.

But their timing was bad. While they were waiting, in December 1979, the Soviet Union invaded Afghanistan. The Cold War got hotter, and exit visas basically stopped getting approved.

Eugene Litvak: **So we, and many thousands of others, became victims of that.**

Dan: Eugene says for most of the next decade, police and the KGB called him in, searched his house, threatened him with prison -- while he and his wife worked basic jobs: she washed floors in a factory. He delivered telegrams.

When they finally got to the U.S., in 1988, with Eugene's parents in tow, Eugene's job prospects weren't much better.

He says he had contacts with well-known scientists, but not great English. He worked in a hotel gift shop, then behind the desk.

And practiced his English by cold-calling stores from the Yellow Pages.

Eugene Litvak: **Like Home Depot. Asking may I buy, you know, the air conditioner? And then the supermarket. The CVS. I was doing that on a regular basis until people started understanding what I want from them.**

Dan: He eventually got some consulting work. And he found his calling -- his obsession -- bringing his training as an operations engineer to U.S. hospitals -- when his father's health went downhill.

Eugene Litvak: **I saw the failures in operations at the hospital by spending a lot of time with my father.**

Dan: And his chutzpah — and his persistence — all of that, really shows itself in what he did next:

Eugene Litvak: **I sent a letter actually to every hospital president in Massachusetts, offering my services to help.**

Dan: No takers. No responses. But in 1995, the vice president of a big local hospital, Mass General, gave a lecture about how new market conditions meant hospitals would need to get more efficient.

Afterwards, Litvak stepped up, introduced himself-- and got an invitation to drop by for a chat. In that meeting, his new pal the Vice President gave him a small assignment -- one that Eugene didn't get to finish.

Eugene Litvak: **He interrupted me before even implementation. He said, we have a more important project and that is operating room.**

Dan: Operating room. Surgeries.

Eugene Litvak: **So that's how it started.**

Dan: A doctor named Mike Long, who ran logistics for the hospitals surgeries, had been pushing to get things more efficient.

Some days, surgical patients crowded the hospital, so doctors and nurses sweated through expensive overtime. Others, the place was quiet and the hospital lost money staffing empty beds. Nobody could figure out why.

Long and Litvak became a team, with two big strengths: One, they were kindred spirits.

Eugene Litvak: **As he described it, you know, long lost twins.**

Dan: And two, they had complimentary expertise:

Eugene Litvak: **He knew healthcare very well, which I didn't, and I knew operations management, that he didn't know.**

Dan: They dove in together, pulling data, talking to people, and observing. The two of them worked and worked. For months, Litvak watched the weekly 6am meetings where surgeons would set their schedules.

They had a hypothesis: Sometimes more people just showed up in the ER: More broken legs, more burst appendixes. The ER got crowded, and so did the rest of the hospital.

So they searched their data for ways to predict or manage that problem.

And then one day, a totally different answer literally showed itself to them.

This was the 1990s, before PowerPoint. To share their data, they printed charts onto transparencies -- plastic sheets for an overhead projector.

One day, in Mike Long's office, they noticed a couple of these sheets sitting one on top of the other.

One had a line showing scheduled surgeries -- more this day, fewer that day. The other had a line showing, day by day, how many hospital beds were full.

Eugene Litvak: And we look. Wow, it's almost the same. We put it against the light in the window and they almost coincided. That was an aha moment.

Dan: When the line showing scheduled surgeries went up, so did the line showing full beds -- crowding. They went down together too.

Eugene Litvak: It was clear message.

Dan: The question they'd been working on-- why does the hospital get so jammed sometimes?

The answer wasn't random at all. It had nothing to do with random surges in patients showing up in the ER.

The hospital got jammed -- and the ER got backed up with patients waiting for a bed upstairs -- when there were more surgeries scheduled.

And there was a definite pattern: There were a LOT more scheduled surgeries early in the week, on Mondays and Tuesdays.

He’s taken to calling it “weekday-related disease”

Eugene Litvak: Weekday related disease that manifests on a particular week days.

Dan: On those days, there was no give in the operating-room schedule, a lot fewer open beds on the wards. When a normal day's batch of emergency cases showed up-- wham. Things got jammed.

I told Eugene: Hearing all this after the fact, it just seems -- obvious. You schedule a bunch of surgeries, you're gonna fill up the hospital, right? He was like, well, yeah.

Eugene Litvak: As one of the hospital's chief medical officers said, Eugene pointed us to absolutely unexpected event that during the winter we have snow.

Dan: Right, but this hadn't kind of occurred to anybody before.

Eugene Litvak: No. And the first people reaction was practically calling me names.

Dan: People in the hospital did not want to believe what Eugene's data showed.

Which is easier to understand given what Eugene had seen when he observed the surgeons doing their 6 a.m. scheduling meetings for those six months.

Each surgeon basically called dibs on a block of time for each week. And certain blocks were highly coveted:

Eugene Litvak: Every surgeon wanted to do the surgery Monday morning.

Dan: The intensity of the scramble for those times had puzzled Eugene. He asked his partner Mike Long about it.

Eugene Litvak: I said, Mike, I hear they're fighting for this morning, block times as they would fight for their spouses. And he said, Eugene, you don't get it. He said they would rather give up their spouses than the morning, Monday, block time.

Dan: Would rather give up their spouses than Monday morning block times. There were reasons-- beyond just wanting the rest of the week clear.

Like: Surgeons wanted to come in and do their best work when they were fresh from the weekend.

They wanted the early-morning slot for the same reason frequent travelers want early flights: Later in the day, your schedule could get delayed because of some problems that happened earlier.

And if you operated on somebody later in the week, they might have to spend the weekend in the hospital. When, yeah, you might get called in to check on them.

But also: hospitals operate with skeleton crews on weekends. Fewer nurses, less staff around for services like physical therapy.

Surgeons may have been looking out for themselves, Eugene says, but they were also trying to look out for their patients. And failing on both counts.

Eugene Litvak: **They're the first and foremost victim along with their patients of this mismanaged operation. They're trying to do their best, but, but the system is screwed up.**

Dan: And they did NOT want to hear some engineer telling them when they should operate.

Eugene Litvak: **I talked to one of the prominent cardiac surgeon, really talented person. And, he told me, Eugene, how dare you are to teach me when I supposed to operate on my patients. Even my patients do not know when they should be operated on. How can you do that? And I said, okay, uh, your point is well taken. May look at your data, talk to your data people. He said, sure. So I talked to the data people. I came back and I said, look, I would like to be your student. As such, I would like to learn what kind of a disease your patients have that manifests itself every Tuesday**

Dan: **And how did he respond?**

Eugene Litvak: **From that point, he avoided talking with me.**

Dan: In his book, Mark Taylor reports that resistance like this from surgeons prevented Mass General from actually implementing Eugene Litvak and Mike Long's recommendations.

Mike Long retired from Mass General in 2000, and Litvak's consulting contract ended.

But by then they had compiled enough evidence to start publishing their findings in medical journals. And attracting allies in the field.

At Boston University, Litvak set up a tiny research center with big names in medicine on the advisory committee: Like the CEO of the organization that accredits most U.S. hospitals.

Hospitals brought Litvak in to consult -- including the Mayo Clinic and Johns Hopkins. Mark Taylor's book says they undertook limited projects that achieved impressive results --but never expanded.

And then in 2004 a couple of doctors from Cincinnati Children's Hospital went to one of Litvak's talks, and came away... impressed. Litvak ended up talking with the hospital's CEO, Jim Anderson.

Jim Anderson CCH: **And I thought this would be a fun adventure to pursue.**

Dan: So he did. The adventure they undertook at Cincinnati Children's remains Eugene Litvak's biggest success to date. That's next.

This episode of An Arm and a Leg is produced in partnership with KFF Health News-- that's a nonprofit newsroom covering health issues in America. Their reporters do amazing work and win all kinds of awards every year. We're honored to work with them.

As a first step, Cincinnati Children's Hospital had Eugene Litvak do an evaluation and present recommendations to the lead medical staff.

Eugene Litvak: **Vice president, chief of surgery, chief of anesthesia, et cetera, et cetera.**

Dan: Eugene's prescription: Change how you schedule surgeries, spread them out across the week. As he recalls, everybody seemed agreeable, and the CEO Jim Anderson made a proposal on the spot.

Eugene Litvak: **So he asked me, Eugene, okay, would you do that for us now to implement what you are preaching for? And I said, no. And he said, how come? I said, because these very people who smile at me would create roadblocks, and I'm not sure I would overcome it. So he look around the room and said, okay, if you face any resistance, you call me directly. He looked at me again and said, would you do it now? I said, absolutely.**

Dan: Jim Anderson recalls that part of the exchange a little differently.

Jim Anderson CCH: I remember telling them and said, look, we're gonna do this anyway. We'd love to have you involved if you're not. That's fine. Go away. But, uh, we're committed.

Dan: However that exchange went, the follow up was real.

With Litvak's guidance, the hospital reorganized the way it scheduled surgeries-- and saved a hundred thirty-seven million dollars a year. They'd been planning to build a hundred-million dollar new tower to increase capacity, but with their new systems, they decided they didn't need to.

Actually, Jim Anderson told another interviewer: without adding a single bed, the hospital took on more cases, AND wait times for patients went down by 28 percent. Nurses, surgeons, and anesthesiologists reported they were able to take better care of patients.

Jim Anderson says the hospital was making other changes too, but he gives Litvak lots of credit.

Jim Anderson CCH: Eugene was a wonderful stimulus, to helping us, think outside the box and reorganize and really, uh, be more effective at what we did.

Dan: And yet, almost twenty years later, he’s had clients here and there. But few institutions have gone as far as Cincinnati Children's in following Litvak's advice.

Jim Anderson CCH: It's been a mystery to me for decades now. I'm astonished by the lack of response.

Dan: That's the mystery Mark Taylor stumbled across when he started reading about Eugene Litvak's work years later. He started calling sources for a reality check.

Mark Taylor: Most people in the hospital business knew nothing of him, hadn't heard of him at all. But some of my best sources as a healthcare journalist, told me, you know, this guy is really onto something. and it was like, Jesus, this guy's right. How come nobody else knows this?

Dan: He started reporting his first story on Litvak for the Chicago Tribune and basically asked Litvak himself: Who are your opponents?

Eugene Litvak: He said, Eugene, I'm health care reporter. I should be objective. You have the names of supporters and coauthors. I would like to know the names of naysayers so I can interview them, and I said, here is what I can do. If you find the one, I owe you a dinner.

Dan: He's had a lot of time since then. Since that was like what, seven, eight years ago?

Eugene Litvak: Yeah.

Mark Taylor: I talked to well over a hundred sources and I called all kinds of hospital executives, consulting firms, and I couldn't find anyone who said, a, this doesn't work. B, his, algorithms are wrong. C this is a fraud. They're making up details in that.

Dan: So what's the holdup? In my first conversation with Eugene Litvak, we talked about why more hospitals don't go with his recommendations-- even after they hear about successes at institutions like Cincinnati Children's.

Eugene Litvak: I've been told by other hospital leadership, those are special hospitals. Our hospital is different. Our patients are sicker. Uh, at one hospital, they asked me, it was in South Carolina. They asked me whether I ever implemented that in South Carolina.

Dan: Implemented his idea that by reorganizing surgeries, hospitals can save money and take better care of patients.

Eugene Litvak: And I said, that's a management law has nothing to do with the state. And they said, no, no, no, it does. Uh, and I said, then let, let me, I'm curious whether gravitation law works in South Carolina.

Dan: How did they respond to that?

Eugene Litvak: Uh, people just get angry from some of my comments.

Dan: Political maneuvering, may not be your strong suit, not to tell you anything you may not have heard before.

Eugene Litvak: Yeah.

Dan: So I left that conversation with a hypothesis: Maybe this guy just doesn't have the diplomatic skills for this kind of work.

But when I ran that hypothesis by Mark Taylor, he had a counter-example from Litvak's work at Cincinnati Children's Hospital.

The administration was backing him, but they said eventually the various department heads would vote his specific plan up or down-- so he needed to secure *yes* votes.

Mark Taylor: He said, Mark, I, I lied a little bit. I would meet with these different constituencies, the orthopedic surgeons, the anesthesiologists, the nurses, the administration, and each one I would go to, I would tell now don't tell anyone else, but your group is gonna benefit disproportionately from this

Dan: And then -- as Eugene told me -- the leaders met to vote on his plan.

Eugene Litvak: So everybody raise his or her hand and look at his peers around with a slight smile. Say, oh guys, I know something you don't, you know, I benefit more than you.

Dan: Eugene Litvak's diplomatic skils -- or lack thereof -- maybe aren't the whole issue.

He and his supporters have another hypothesis.

Namely: It's hard to change institutions.

Surgeons are trained to fight for those Monday morning block times-- and in hospitals, they have a lot of clout. They bring in patients, and administrators are afraid to cross them.

Here's one of Eugene Litvak's most vocal allies

Peter Viccellio: My name is Peter Viccellio. I work at Stony Brook on Long Island, and I'm an. Emergency physician

Peter Viccellio: and I am in my 48th year of practicing emergency medicine

Dan: Peter's published big studies with Litvak, goes on conference panels with him.

And he's got a very long view on medicine and hospitals. Not only has Peter himself been practicing for decades, his dad was a doctor. Peter used to go with him on house calls when he was a kid. He says in those days

Peter Viccellio: If you had a stroke, you stayed at home. If you had heart attack, you stayed at home. 'cause the hospitals had nothing to offer you. So it made sense to have a hospital nine to five, Monday through Friday with a skeleton crew on evenings, nights, and weekends.

Dan: He's seen the role of medicine and hospitals change dramatically

Peter Viccellio: When I was in medical school, if you had lupus, you died when you were 18 years old. Now I see 70 year olds with lupus. It's amazing what I've seen. I think when I graduated from medical school, the only cancer that you could really cure was Hodgkin's Lymphoma. That was it. And there are so many cancers now that can be cured, or at least can be substantially slowed down and contained. So it's just a dramatic change.

Dan: But even though hospitals do so much more now, they haven't changed their basic schedule.

Peter Viccellio: We have a seven day a week problem, and we're still trying to solve it with a five day a week. Solution. And when I say five days a week, I mean eight hours each day of those five days a week. So that's 24% of the week that we are running full fledged.

Dan: And just changing the schedules for surgeons wouldn't be enough-- as Peter says a surgeon would tell you.

Peter Viccellio:If you wanna do a hip case on a Thursday or Friday, is there enough physical therapy present on weekends to get the patient up and walking around? Do you have the needed ancillary services and whatnot to get stuff done?

Dan: And he says hiring extra staff for weekends may sound expensive. But...

Peter Viccellio: if you're doing more stuff on the weekends. But you have the same volume. It means you're doing less somewhere else. So it's called redistributing the load.

Dan: And people's lives get more predictable -- less emergency overtime. And according to Eugene Litvak's modeling, you don't necessarily need to go twenty-four seven.

Peter Viccellio: if you went at this for six days a week, so that a Saturday was just like a Tuesday, then you'd get a huge gain.

Dan: But Peter says the old five-day-a-week schedule -- and the problems that come with it-- aren't just U.S. phenomena.

Peter Viccellio: I've been to Italy and Korea and England and Scotland and all sorts of different places talking about the same exact problems that we have here.

Dan: So while the capacity of medicine has exploded, the culture of hospitals is entrenched.

Instead of asking, Why haven't more hospitals done what Cincinnati Children's did, it might have been smarter to ask: How did Cincinnati Children's decide to jump in with both feet?

The answer turns out to be: Jim Anderson, the CEO, had taken a fairly unusual path. Before becoming the CEO, he had never worked for a hospital before.

He'd been a lawyer for most of his career -- but had taken a few years out to run a local manufacturing company. While in that job, he joined the board at Children's -- and stayed on it for almost twenty years.

Jim Anderson: I ended up being chairman of the board and we needed a new CEO. And, um, we looked around and I lost control of the search committee and they turned on me and wanted me to do it. And so I agreed.

Dan: That was in 1996. By the time Eugene Litvak came to Children's, Jim Anderson had been the CEO for ten years. He had been part of the organization's leadership for a quarter century.

Jim Anderson: I am much more comfortable, much more comfortable taking risks and pursuing adventures, than the typical medical community.

Dan: And even though he had that outsider's perspective, he had the insiders' trust.

Jim Anderson: **The presumption was because we all knew each other and had worked together for so long that I wasn't gonna do crazy things.**

Dan: And to Jim Anderson, there was nothing crazy or unfamiliar about operations management. Because like Eugene Litvak — and, as far as he knows, unlike most health care executives — he had worked in industry, in manufacturing.

Jim Anderson: **I mean, if you went out and laid those out as criteria for your next CEO, you'd have a hard time filling it. It's a lot, a lot of luck involved.**

Dan: Eugene Litvak has continued to attract clients one at a time -- a hospital in Toronto, a clinic in New Orleans -- and sometimes more. He says he's currently working with the Canadian province of Alberta.

His ideas haven't been adopted at that kind of scale in the U.S., but he thinks eventually hospitals will come around. Because they'll have to. Many of them are in trouble financially.

Litvak compares hospital CEOs to a guy falling from a skyscraper.

Eugene Litvak: **And, in the middle of his fall, he said, oh, where I'm going, but touching his arms and legs are so far so good.**

Dan: Republicans in Congress are talking about cutting hundreds of billions of dollars from Medicaid. That's a lot less money for hospitals.

Eugene Litvak says the government could save much more by offering hospitals technical support to adopt his program. He couldn't do it all himself.

Eugene Litvak: **We are a small organization, but we can teach many other big sharks like Optum, Ernst & Young consulting company, Deloitte, McKinsey, how to do that. We could certify them and teach them how to do that. They have thousand, hundred thousand boots on the ground, so you can do that.**

Dan: One way or another, he'll keep at it. He tells me about an exchange with one of his advisory board members, a guy named Bill.

Eugene Litvak: **At one of our board meetings, he told me, Eugene, I admire your persistence. And my answer was, Bill, if at one point, you feel like you want to call me an idiot, don't mince your words.**

Dan: If Eugene Litvak is an idiot, I would like to meet a lot more idiots like this.

Meanwhile: We've been working hard on a two part series for next month. About dealing with the high cost of drugs.

A while back, we asked you to share your stories about sticker shock at the pharmacy

Listener: The pharmacist would burst out laughing every time I showed up to pick up the prescription and he saw the charge.

Dan: And we asked you what you'd learned. You came through in a big way. Your responses taught us things we hadn't understood before. And in our next two episodes, we'll be sharing it all.

That starts in a few weeks.

Till then, take care of yourself.

This episode of An Arm and a Leg was produced by me, Dan Weissmann, with help from Emily Pisacreta and Claire Davenport -- and edited by Ellen Weiss.

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Thanks! And thanks for listening.