*Welcome to **The Vurge Podcast**, where we bring together groundbreakers and industry disruptors from various corners of the virtual world to ponder the future of technology innovation.*

Steve Weichhand: I'm your host, Steve Weichhand with Divurgent and today, we're going to talk about how organizations are starting to put information into the hands of frontline physicians to reduce clinical variation.

I have with me, Steve Waye, the founder and COO of Agathos. Steve and I overlapped for a brief amount of time while at Epic, where he spent four years.

After leaving Epic, he founded Agathos, which is a transparency platform designed specifically for physicians. Agathos integrates clinical claims and economic data to generate simple, actionable and user adaptive insights and then they put that information into the hands of physicians. Welcome to the show, Steve.

Steve Waye: Thanks, Steve. Thanks for having me. Appreciate it.

Weichhand: So, Steve, can you talk a little bit about what clinical variation is and what the issues that it creates in health care?

Waye: Sure. So, high level clinical variation is overuse or underuse of medical services. So, things like lab imaging, expensive medications and supplies, and surgical procedures.

So, lots of variation is caused by differences in things like severity of illness or other ambient factors that are difficult for those providing care to control. Things like drug, alcohol, or tobacco use on the part of the patient, adherence to the care plan and medications prescribed once patients leave the hospital, and the general access to, on the patient's part, to quality medical services.

But there's also a pretty staggering amount of variation amongst care providers in the types of services for patients with the same issues in similar socioeconomic situations at the same hospital sites and that's the low-ish hanging fruit that health care systems can focus on, but struggle to do so for a variety of reasons.

We focus, specifically, on variation in care between physicians in hospitals. So, most physicians don't get much feedback, if any, once they leave residency and aren't even aware that this type of variation exists. That's what we aim to do, is get retrospective data about individual physician care patterns into the hands of physicians themselves to help them discern where there are opportunities to follow best practices and both teach and learn from others within that group.

Weichhand: Thanks for that, Steve. I poked around a bit on the internet before the show and I ran across a really interesting study about how big of a problem clinical variation is. In 2016 the Institute of Medicine estimated that $265 billion dollars, billion with a B, or around 30 percent of health care spending is related to waste that directly results from clinical variation.

So, given the size of the issue, why do you think there hasn't been a bigger focus on variation reduction in health care?

Waye: Yeah, that’s a great question. And I'm familiar with that study. I think it probably lives in the bottom of a lot of our slide decks.

I think that from an opportunity perspective, there's never market sizing questions in health care. It's about, “Can you execute in a really complex environment?”

And I think to your question around why there hasn't been a larger focus. I think, in some ways, there has been. We run across this all the time; I just got off the phone with the Head of Clinical Variation Reduction at Mass General this week and it's exciting to hear how many people are focused on this, but they're focused on this in a somewhat siloed way. What we want to do is bring a lot of those efforts together.

But I think the reason that it hasn't been tackled in a large, scalable way is that there's just a lot of nuance involved. So, your users are physicians who are extremely smart, extremely well trained, and there's not a lot you're going to be able to share with them that they don't already know. So, you have to be respectful, nuanced, and detailed in your analysis.

And also, these are really busy people. So, you have to provide data that's going to be compelling in a couple minutes or less; something where they can look at it while they have a quick break. Something like that.

That's the reason we have a panel of 20 plus physician advisors on our team. All of the insights we create and we send to our physicians are a partnership between a data scientist and a physician, to make sure that we're nailing those adjustments in that clinical nuance.

So, for example, one of the things we look at is the recurring order of daily common labs pulled from something called Choosing Wisely, which is a bunch of examples of things that are best practice, so not placing labs on a recurring daily schedule is one of those things but, it's a little bit more complicated than it seems and you have to understand those nuances to really get through to physicians and have them receive the things you're sending in a way that they'll be receptive to.

So, those little parameters and adjustments based on "Are these orders from specialists? Which specialists should we consider; orders that should be

canceled versus orders that shouldn't be canceled? How you shouldn't be placing these orders all the time, but you also shouldn't be placing them never. So, what's the right amount?" Being able to pull in benchmarks and adjust for those things in a nuanced way really provides lots of credibility.

Weichhand: Interesting, what you're saying actually reminds me a lot of an operations book that I read in business school. The name of that book was "The Goal". In the book there is a manager, Alex, and he runs a manufacturing plant and he had to figure out how to improve the plant efficiency or the plant was going to close down. He started focusing his attention on the wrong things, like purchasing decisions, or certain pieces of the supply chain. Ultimately, he found out that process variation was a big issue. In an overly-simplified way of explaining it, a couple of the key takeaways from the book, and this is where it aligns more with what you're talking about, were that measurements should be aligned to your ultimate goals, thus the name of the book, and that these measurements should drive behavior. You should put them in front of people that have the opportunity to adjust behavior to improve those metrics. We've seen examples in health care where defining the wrong key measurements, or not displaying that information to the right people, has actually been destructive. Think about how in the late 90s or early 2000s, CMS tied reimbursements to performance on various quality measures, like prescribing pain medications after a procedure. There are many that would say that this type of incentive greatly contributed to the recent and still ongoing opioid epidemic. So, you need to be careful about selecting metrics, you need to focus on the outcomes, or goals, instead of specific steps to get there. Thinking about these key takeaways from the book, "The Goal", what type of data or KPIs are important in addressing clinical variation?

Waye: Sure. So, I think one of the high-level challenges is, of course, health care is a business and hospitals need to be mindful of their margins and their bottom line in order to continue providing service and caring for patients. And that's a really delicate balance. And if the incentives aren't cut in the right place, which is the case in a lot of areas, you're going to incentivize the wrong things.

Either you're going to incentivize more exclusively your profit margins at the expense of high-quality patient care or the other direction; you're going to waste the precious resources you have to manage and you won't be able to stay in business.

So, it's a balancing act. One of the things that we focus on is aligning administrator incentives and physician incentives and making sure that everyone's focused on the same thing.

So, I think a great example of that is length of stay. We focus particularly on inpatient care. We felt like there was a gap there. The data is a little bit cleaner than in outpatient care and with a system where the hospital is incentivized to manage a certain diagnosis sector like, let's say, pneumonia as efficiently as possible. Broadly speaking, if it takes you three days to care for a pneumonia patient and it takes the hospital down the road, five days to care for a pneumonia patient, you're both going to get paid the same thing.

And so, ultimately, you're trying to be as efficient as possible while also providing high-quality care.

So, that is something that hospital administration is focused on and it's hard to get physicians to really care about that because they're just focused on how, “I just want to provide the best care for my patients. I want to make sure they get well under my care.”

But, yes, *physicians are a part of this ecosystem and need to find a way to manage towards these goals that keep the hospital alive and allow them to continue caring for patients.*

So, the problem is that historically, I think a lot of physicians facing metrics have been something akin to like, “Hey, average length of stay is like 3.4 days. Our goal is for it to get down to 3 days.” And physicians kind of collectively shrug and say like, “Okay. Well, I think I'm caring for my patients as efficiently as possible. So, I don't know. I think I'm probably doing a pretty good job.”

And it doesn't really address a lot of, I think, fair and common complaints from physicians that there's a lot of factors that are out of their control that dictate how long the patient stays in the hospital. They might have nowhere to go, they might have nowhere to be discharged to, and no one to pick them up. They might have several other comorbidities that get kind of baked into this diagnosis group that make the patient more complicated to manage.

And so, there's just a bunch of those ambient factors, but that doesn't discount the fact that there are still things the physicians do and they're ultimately the decision maker that decides when the patient does go home.

So, what we do is map some of those actions that are really within the physician's purview that have been shown through research to affect how long the patient stays in the hospital. When you focus on those actions that are specific to patient care, that's when you can get a physician's attention.

So, for example, something we found was commonly delaying discharges was a patient needing a physical therapy or occupational therapy counsel. They need to first determine such a consult is needed. They need to make sure that the physical therapist or occupational therapist is available. And so, if those are done in the first 48 hours of the stay, it has a huge sort of outsized impact on how long the patient stays.

And there's lots of those types of things. How efficient are you in providing documentation to the next physician that's coming on shift when you're going off shift? That has a huge amount of variation.

So, it's all these little things that add up and there's probably like, seven out of 10 things that you do really well, two out of 10 things that you do okay and one thing that you just like weren't even aware of that you should be paying attention to. And it's by personalizing that and really focusing on, “Hey, what message does this physician need to receive at which time in order to really focus on the thing that can really help them improve rather than just blasting this information out on a high level, which isn't specific and isn't actionable” that we found has really made a difference.

And it's not just about the standards. Other metrics we focus on; utilization metrics, things that are more purely patient quality focused like “how frequently do you send patients home with opioids?”, obviously, that's a hot button issue right now that's more of a care quality issue than financial issue. We analyze the full spectrum of those types of metrics.

Weichhand: This next question may be more relevant to the quality type metrics than the financial or throughput type metrics that you've talked a bit about. But I know probably most others believe that some clinical variation is a good thing. As an example, personalizing medicine or tailoring treatments to specific patient needs is used to now improve outcomes and reduce costs.

So, how do, in just overall or at Agathos, tell the difference between appropriate and unexplained clinical variation?

Waye: Yeah, that’s a great question and I totally agree and there's a lot of companies that are doing super great and valuable work in the precision medicine space. There’s a lot of solutions that are patient specific like point of

care, broadly termed clinical decision, support type of solutions like if you're placing an order in the electronic medical record and it conflicts with an allergy that the patient has, you'll get a pop-up. That's super valuable. But I see you kind of smiling a little bit.

It's something that I'm sure both you and I worked on quite a bit at Epic. And I think there's also a lot of, what's known as alert fatigue, where the system isn't always configured appropriately for the local needs of the hospital. Sometimes you're getting a bunch of pop ups that are completely irrelevant.

And what that does is it creates a bunch of noise that filters out good things that the physicians actually need to hear and they just end up clicking through everything.

But I think there's a time and a place for those types of solutions and there are really good ways to apply them.

I think on the other end of the spectrum, there's more high-level administrative reporting. So, the kinds of things I was mentioning before; we are looking at health metrics like readmission rate, length of stay, et cetera, but they don't really drill down into what individual physicians are doing.

So, I think we felt this gap of providing retrospective analysis for a large sample size so that it's a truly meaningful sample. And if there's an outlier, you can say like, “Okay, this isn't just something that happened once or twice. This is becoming a pattern.”

And then in terms of figuring out what's warranted and what's unwarranted, it's a challenge of how narrow or how broad you want to get in the metric that you are trying to address?

So, in the daily labs with the opioids example that I gave you, it's very cut and dry where it's like, “Did you order it at a lab on a daily recurring schedule? Did you discharge the patient with opioids?”

It's more of a rifle and a shotgun approach. Then there are things that are a little bit more complex, actually, quite a bit more complex, like “When do I order MRIs? Am I ordering too many or too few?” that you could take the approach of chopping up every single use case of like four patients with lower back pain, you shouldn’t order MRIs.

Again, you're able to be more prescriptive, but the amount of patients that you're covering, you're just not going to get enough from a frequent sample for it to really tell you a whole lot unless you're looking across a year’s worth of data.

So, we try to meet in the middle and provide enough nuance for it to be useful while also a broad enough patient base for there to be enough sample.

So, for example, one of the ways we look at MRI utilization is, we'll look at the number of MRIs you order across, let's say, a month and then we’ll adjust for the number of patients that you saw - what was the reason they were there in the hospital? And then for other patients that were in the hospital for those reasons, what was the expected amount of MRIs that would have been ordered?

So, it adjusts for the diagnosis for the severity of illness of the patient. And it tells you, “Hey, you're ordering, on average, five per 100 cases more than your peers. And that's pretty significant, based on what's expected.” So, it's not just a raw count without nuance, but it's also not so precise that it's a case that comes up like, once every two weeks or something like that. And that's kind of the balance that we try to strike.

And ultimately, we feel like our job is to adjust and provide the right context. And if we do that, we make it easier to curate data for physicians. So, they can see patterns, start discussions amongst themselves, have a light bulb 'aha' moment that allows them to change behavior, based on their own learning and expertise. So, I think it's kind of hand-in-hand partnership in a way.

Weichhand: That makes a lot of sense in accounting for the, again, nuances or unique needs of patients through things like diagnosis. It really makes a lot of sense.

And certainly, even thinking back to our days probably at Epic, where we were building some of those rule based logic trees around things like decision support that you mentioned, but also with order sets and documentation templates and in Epic lingo, smart sets and express lanes and things like that. You know, those types of nuances weren't always very well accounted for and certainly not at the individual physician level. Those were, in my experience, at least mostly organization wide, hospital wide or in some cases, department wide. And I was definitely smiling as you were reminding me of those efforts.

I do want to shift gears, just a little bit, and talk about the feedback process that you're deploying, because certainly collecting this data and identifying the opportunities, that's a very important aspect. But putting that information back in the right people's hands is the other side of the equation. And without that, you're likely not to get anywhere or you're likely not to get very far.

So, you mentioned a little bit about this before in the show. But with few exceptions, physicians largely stop receiving feedback and coaching on their performance after residency.

So, in your experience, working both at Epic and Agathos, have you found that physicians are resistant to receiving this feedback or maybe are there just not great methods in place to get that individualized feedback today, but maybe there will be tomorrow. What's your experience and how that feedback is received?

Waye: Sure. I think physicians, like all of us, are resistant to receiving bad feedback. And that's if they do receive feedback, that's the kind of feedback that they get.

And when I say bad feedback, I mean, feedback that's at the wrong altitude. It's like gets too high level or it's out of date. It isn't accounting for a lot of the clinical nuance.

And what we have also found is that we actually frequently don't get it right out of the gate, so part of our process is we'll work with our internal physician team and our data scientists, we'll get some feedback from customers.

And then we also have a mechanism to get feedback from physicians to us within the app. It's kind of like an Uber-style, 1 through 5 stars. And you can give a couple reasons. "Hey, like this isn't relevant to my practice. This data doesn't look accurate." And in doing that, that kind of feeds into our algorithm and allows us to get better and better and more nuanced at it over time until we're creating something that's really, truly engaging to a physician.

So, I think it's a combination of feedback that is specific, measurable, actual, timely, and relevant.

But it's just hard to find, even if you do have the mechanisms to get in all that nuance, it's hard to find a good time and place to provide that feedback. So, we're not just providing feedback directly to physicians, we're also providing

tools to physician team leaders and department managers to have nuanced conversations with their physicians.

And I think because it's so hard to get data that provides enough of a starting place for those conversations, a lot of hospitals and departments just give up on even trying. Which is too bad because there's so much data out there and it's really rich and there's a lot of missed learning opportunities because of it. So, that's something that really inspires us in our work.

Weichhand: Curating that data, putting in the hands of the right people and presenting it in a way that's actionable has just been a tremendous challenge from what I've seen. So, it's great that you're making strides in that space.

I'm going to combine a couple of questions here. So, you've talked a little bit about how you can present the data to physicians and encourage people to have conversations about unnecessary variation. I'd love to hear a little bit more about that; any examples of where you've seen that be successful?

And then also going along with that question, have you seen health systems or organizations use other interventions other than just, say, a conversation; like using risk scores or changing financial incentives for physicians to reduce these variations?

Waye: Yeah, totally. So, I think we see our tool working for customers at a couple of different levels. One is, I'm not sure if I mentioned this before, providing this feedback consistently and frequently.

The way we send this to physicians via a text message. It'll say something like, “Over the last three months, your opioid utilization percentages are 30 percent higher than those of your peers. See more on Agathos.” And then it'll

take them right to our mobile optimized web application that'll kind of show them how they compare against their peers. It'll show them links to literature that'll show specific case examples from the EMR. And it will show, like I've mentioned before, that ability to get feedback on how effective this really is.

And so, yeah, by providing feedback that meets physicians where they are, there's the light bulb or 'aha' moment, "Oh, I'm an outlier. I didn't even realize that I was."

So, that's one level at which the feedback is effective. And then, you touched on the conversations that have sparked. We work with hospital managers and departments to find physicians that are respected amongst their peers and we'll work together with them to prepare what we call Aga Lunches where physicians will be invited (It's totally casual and voluntary) to a conversation where everyone's kind of looking at the data together.

That works really well for some of the more nuanced metrics that I discuss that aren't black and white. So, some examples of this that have been really effective are talking about consult utilization. A lot of hospitals are really focused on patient satisfaction, it's a big financial driver and so they kind of drill that into physicians' heads.

One thing that a physician leading one of these lunches learned, just by looking at some of the literature that we provided in the application, was the patients' experience correlated with how many specialists they saw and the more handoffs there were in the hospital, the lower the patient satisfaction.

So, that was kind of a light bulb moment amongst physicians, "Okay, this isn't a we do less consults so we save money, and maybe that means that I'm not getting my patient the best care." It's also a patient satisfaction driver.

So, there's all kinds of those things that come up in conversation that are kind of impossible to capture just in an analysis of the data.

I think another set of Aga Lunches that were really helpful were just talking about handoff practices. Those are often not very uniform. Some physicians will call the physician that's coming on shift, some physicians will write out notes on a piece of paper, some physicians will put them in some specific field in the EMR that not everyone uses.

Just talking with people that felt like they were really effective about giving and delivering handoffs, we were able to standardize some best practices.

So, we've seen a lot of hospitals use financial incentives both to -- some hospitals have even provided incentives for physicians to look at the Agathos application.

We tend to discourage those types of things. There's a lot of research that shows that it's really the intrinsic motivators, the feeling of doing a good job, caring for your patients well, that are much more effective. And that's kind of what we cater towards in those metrics, like helping physicians both provide positive reinforcement when you're doing the right thing and then also just letting you know when you happen to be an outlier in a certain type of metric.

Physicians, obviously, are well-paid, but there's lots of ways to make good money that are much easier and less stressful than being a doctor. Research has shown, and our experience has shown, that the amount of money that's given to physicians usually pales in comparison to their salary on the whole to the point where it feels kind of insulting and it can be counterproductive.

So, that's our stance on financial motivators, although they are definitely impacted and in certain cases.

Weichhand: One thing you didn't mention, and maybe this was your next thought, was you are incentivizing them with food through your lunches.

Waye: Yeah.

Weichhand: I don’t know if I got that right. But that's always a great incentive for physicians, at least to attend the meeting. So, you're doing that.

Waye: It's really unbelievable. These are people that are making like six-figure salaries and yet would drop everything for like a Chipotle burrito. It works every time; very, very good.

Yeah. And then I think in terms of other things, I think that that's another challenge when you're working on something that’s complex with as many factors that are influencing the length of stay. There's always a ton of interventions that are focused on that, that are not just Agathos.

So, there is having a robust staff of case managers that are project managing the patient through their stay, making sure that everything's been put in on time. That's something that's really effective.

Geographic rounding, where you have physicians focused on one particular area of the hospital versus focused on a particular patient is something that's proven effective at certain sites, although, there's just beat about that.

I mean, our suggestion is, “Yes, do all of it. There's not one silver bullet that's going to help with your length of stay challenges, as well as like help reinforce physician learning and provide physicians all the support they need. We're just one tool in the toolkit.

Weichhand: Let's do just one more question and that question is, what do you think the future looks like, in terms of clinical variation

reduction? So, where do you see this space going in the next 5 to 10 years; any emerging technology or other vendors other than yourself, of course, that we should really be on the lookout for?

Waye: Yeah. I mean, I think there's a lot of room for this space to grow. There's lots of hospitals that have been leaders in this type of work. Our medical lead, Dr. Michael van Duren, has been doing this work at Sutter for 20 years and he had a whole staff of, I think 50 plus people, doing a lot of spreadsheet work, putting this into slides, going and giving presentations.

And so, we're hopeful that our technology and other folks' technology can, like, cut down on the overhead involved in that type of work and it can also help connect people like Dr. Van Duren and his work at Sutter to the work that folks are doing at Mass General and Johns Hopkins and find ways to further refine those best practices and carry them out to community hospitals that don't have the same levels of resources as those institutions.

So, I think we're a bit on the cutting edge of taking this thing that has typically been done in house or via like one-off consulting projects and scaling it into a technology product. But I think other folks are going to jump in and catch on and certainly there's lots of tools that are native to the EMR that I think can be more friendly to physicians.

But I think whatever the solution is, it has to be something that is physician-driven and physician-led. *I think no matter what the technology, tool or the approach is, if you're not getting physician buy-in at the initial stages of the ground level, then it's doomed to fail.*

So, I think, like everything in healthcare, there's never a super fancy technology silver bullet to a problem. *It's about working with the people that understand the problems, making sure you understand the complexity, making sure that your users understand that you know that complexity, and then*

partnering with them to solve that problem together. So, then the delivery mechanism is just one small part of the solution.

Weichhand: Well, thank you, Steve, for joining us on The Vurge. And I really do wish you the best as you continue to grow Agathos and contribute to fixing one of the, if not the biggest, causes of waste in our health system; clinical variation.

Waye: Cool. Thanks, Steve. Thanks for having me. Really enjoyed it.

Weichhand: Alright, likewise. Have a great one.