

**Our Expert :**  
**Matt Perry****Independent Consultant****About Our Expert:**

- Senior Vice President & President, Surgical Innovations at Medtronic, Inc (02/2019 - 11/2022)
- President, Americas - Minimally Invasive Therapies Group at Medtronic, Inc (01/2015 - 02/2019)

Matt Perry holds more than 30 years of experience in the medical device space. Most recently, he held an executive role at Medtronic where he led the largest operating unit focused on delivering innovative solutions in the open and minimally invasive surgery market. In his role, he was a member of their executive steering committee and oversaw their ~\$6B commercial team in the Americas. Prior to this, he led the Minimally Invasive Therapies Group Commercial organization which encompassed a broad portfolio of medical device and therapy solutions.

**Moderator:**  
**Max Le Sieur****Founder & Managing Partner at Rosemont Legacy**

- MBA, Harvard Business School 2022
- Investment Banking Associate at BMO Capital Markets (07/2016 – 08/2020)

**Expert Insights On:**

- Overview of the robotic surgery market today
- Robotic surgery growth and the main advantages of robotic surgery
- Market size of the robotic surgery industry
- Use cases of robotic surgery – Minimally invasive vs Open Procedures
- Market penetration of robotic surgery
- Key players in the market today
- Key takeaways from Intuitive Surgical's recent earnings call
- Lower bound and upper bound of the market growth rate
- Drivers of market growth
- Opportunity of emerging markets
- Risks and headwinds that could disrupt growth
- Key considerations from an investor's perspective
- How can challenger companies compete
- Stickiness of established products and market positioning
- Fixed and variable costs
- Importance and enablement of analytics

# Introduction



**Max:** Hi, Matt. So my name is Max. I'll be leading this call on behalf of VISASQ Coleman today. As you know, the purpose of the discussion is to learn about the use of robotics in medical surgeries including key players and trends in the industry.

Before we begin, I want to emphasize and remind you that we are in no way soliciting any material non-public information or any information that is confidential and related to any company or organization you are currently or have ever been affiliated with.

So if ever we get close to something that you even may consider to be non-public, please just let me know and I'll take us in a different direction that is not at all of what we're trying to accomplish here. Any questions before we begin?

**Matt:** No, that sounds great, Max. I appreciate it.

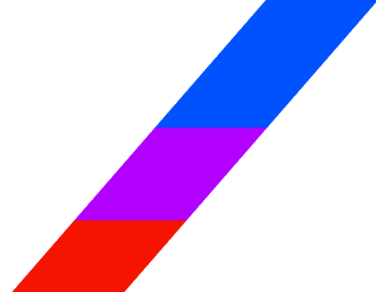
**Max:** Awesome. So if you don't mind just starting with a very brief overview of your background and then I'll hop into the questions.

**Matt:** Sure. So again, thanks for having me on today, Max. As you can see in the screen, my name is Matt Perry and my background is I worked for about 31 years in the med device space for a large multinational company. And our primary portfolio where I specialized or where I worked was surgical instrumentation.

So we made a wide variety of instruments for surgery across multiple specialties. So pretty much anywhere in the world if you had surgery done, there's a pretty good chance that one of the products that our company manufactured was in that procedure.

So I had a variety of roles over my career, anywhere from the sales rep over the course of my career. I ended my career the last three and a half years as the global business unit president and really enjoyed my time there, and now I'm thankfully enjoying retirement.

# Market Overview



**Max:** Awesome. Thanks, Matt. So jumping right in to our first topic here, which is just an overview of the market. Can you provide an overview of where the robotic surgery market is today?

**Matt:** Yeah, sure. And maybe even just prior to just getting into the specificity of the size of the market, we'll spend just a minute on why robotic surgery has grown so quickly and some of the main advantages of robotic surgery over both open and laparoscopic surgery.

So first off, robotic surgery procedures are minimally invasive. So that's the only way you can do robotic procedures, which is a huge benefit to the patient versus open surgery. So instead of opening a patient up, you're going to do surgery through small ports and the patient recovers much, much faster versus open surgery.

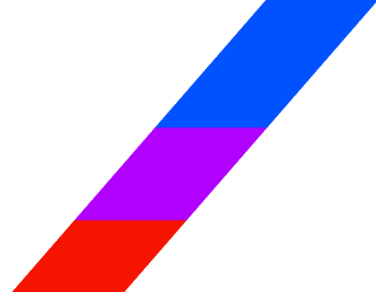
Then you've also got laparoscopic surgery. So the real question is when you compare robotic surgery to laparoscopy, which they're both minimally invasive, but there's still some significant advantages to the robotic platforms, and the first one I'd call out is better visualization. Surgeons use a nice 3D visualization system. It's a relatively immersive system, so you just have better visualization in those robotic procedures than you would in a laparoscopic procedure.

Secondly, I'd say you're able to do more precise, more precision with a robotic platform. What a robotic platform does is it helps reduce any of the tremors or potential shaking of the hands or the instruments inside the patient. So you can be much more precise when you get into some fine dissection in a procedure with a robotic platform.

And I would say from a surgeon perspective, it's a lot more comfortable. So imagine standing up over the patient in a laparoscopic procedure, working with a variety of instruments, looking up at a screen versus in a robotic procedure you're sitting in the corner of the room, a nice comfy chair, the ergonomics is much, much better.

And then I would just say the flexibility, or I should say. Even though these systems are very, very complex, what we've seen over the years is surgeons are able to learn and become proficient in robotic surgery much faster than sometimes they can in laparoscopic surgery.

# Market Overview



**Matt:**

So they're very complex systems from a development perspective, but surgeons tend to learn faster on these systems. So that's the overall benefit of doing a procedure robotically versus open or laparoscopically. So when you talk about the market, and I'm going to caveat this, so my experience is in the soft tissue multi-port or single-port robotic systems, and there's also some endo-luminal systems that are out there today, and that's the market I'm most familiar with, Max.

So I'm going to put the guard rails around my conversation in that multi-port, single-port, soft tissue robotic. There's obviously a lot of other robotic systems out there specifically in orthopedics, but we're not going to use those in the sake of this conversation.

So when you narrow it down to that multi-port, single-port, soft tissue robotic platform, I'm going to say that the market state is about \$9 billion. So it's a long answer to a very short question, but I'll leave it at \$9 billion.

**Max:**

Okay, super helpful. And sorry, can you just help us categorize, you use a lot of specific terms there and I think I understand, but is the right way to think about generally speaking, very complex and scary surgeries wouldn't be done with robotics and the best use case or some of the better use cases are simple, more straightforward things for which going open doesn't really make sense.

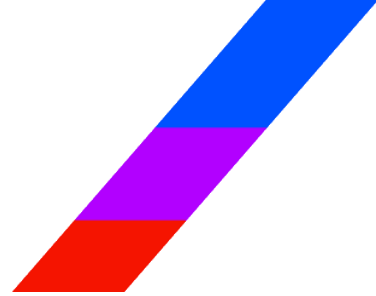
**Matt:**

No, I think more easy. It's really not the complexity of the procedure which states whether or not a robotic platform. A surgeon can perform a variety of procedure open laparoscopically or using a robotic platform. It's just a choice of how he or she decides to do this surgery.

It's really not a function of saying, I won't do this surgery because it's too complex for robotic platform. It's really the surgeon preference, but we'll also dictate that to a certain degree, Max, is the instrumentation required for that procedure, right? There's a portfolio of instruments that go on the robotic arms and if you need a different set of arms, you're not going to have that on the robot.

So the procedures where robots are used today is so dictated by of course, regulatory approval. That's the first and foremost thing, surgeon preference in terms of the approach and then the instrumentation that is required for that procedure.

# Market Overview



**Max:** Okay. And sorry, just one more follow up on this point. So the key distinction is really that, is really you don't have to open up, you can just use a small entry point, you used the better term for it earlier, and a piece of machine with a camera and a knife, and then the surgeon can do it without having to open up the patient.

**Matt:** Yeah.

**Max:** That's the key?

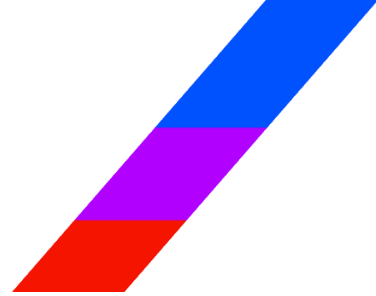
**Matt:** Exactly. So that's the difference between a robotic or a laparoscopic procedure first in open procedure. So just as the name says, an open procedure means you're going to open that patient up, maybe you're going to open up their abdomen, open up their chest, you're going to have a large incision.

Laparoscopic approach and a robotic assisted approach. Use small incisions and small ports inside the patient's body. They'll insufflate the patient's abdomen for abdominal surgery and they'll make four, maybe five small incisions. So from a patient recovery perspective, laparoscopic or robotic surgery, which all kinds of fall, they both fall into that category of minimally invasive surgery, which makes sense, minimally invasive.

Those procedures are much better from a patient outcome perspective, just the post-op pain, the healing, the ability to get back to work and the things you want to do, doing a minimally invasive procedure is much better than open procedure.

**Max:** Got it. That's helpful. And so you use this guardrail number 9 billion. Can you just also provide the context around penetration for using robotics. In a market like the US market, for example, are robotics used every time they could be used and they're qualified to be used or are they not penetrated to that extent yet?

# Market Overview



**Matt:**

Yeah, I would say definitely the latter. They're not penetrated to that extent yet. So where the indications and clinical applications have been improved from a regulatory perspective, those procedures, you're still, again, a physician, a surgeon has three choices to do it open, laparoscopically or robotically.

And from a penetration perspective, we can talk a little bit about this in greater detail. There's still a mix of procedural volumes. So for example, if you look at some of the procedures, there's a highly, highly penetration of robotic approach.

The most highly penetrated would be prostatectomy, which is where robotics got its start 20+ years ago. You've got other procedures where maybe they're not nearly as penetrated and maybe they're only in that three to five or five to 10% penetration rate.

And that's a function of where the surgeon may not have adopted robotics for their approach, they're still doing it laparoscopically or open. Or it may be a function of accessibility where that robot, the facility where that surgeon works only has a certain number of robots and they don't have access to it the day that they do surgery, which means that obviously, if they don't have it available, they'll opt to do that procedure most likely laparoscopically.

**Max:**

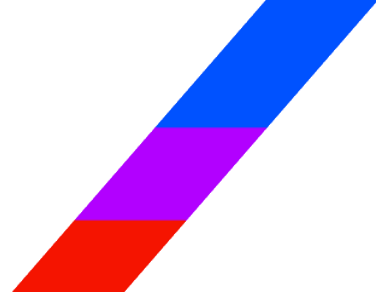
Got it. In most cases, is it a capacity issue or is it a adoption issue?

**Matt:**

I think, again, depending on the market, my take on that would be an accessibility issue, because if you are a surgeon and you've been trained on how to use one of the surgical robots and you've proven efficiency on this and you've done procedures, my sense is that you're going to want to continue to do those procedures robotically for all the reasons I stated at the very beginning of this discussion versus laparoscopically.

It's just better visualization, better dissection, better comfort ergonomics for the surgeon. There's just so many advantages. So I think surgeons would always prefer to do it robotically once they've been trained and they understand how to do it. But accessibility says that they can't use it in all their surgical procedures.

# Market Overview



**Max:** So it's almost like the vendors in this space are having a hard time keeping up with the demand. Is that a fair way to characterize that capacity issue, that accessibility issue?

**Matt:** Yeah, I think there's part of that, but I also think there's also an affordability issue. So hospitals, think about if a large hospital might have 20 to 30 operating rooms in their facility where surgery is done, now, are they going to put a surgical robot in 20 or 30 operating rooms at the cost of 2 million per robot? Probably not.

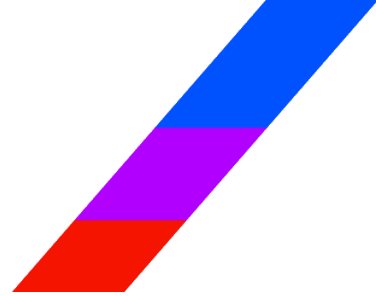
So they've got to decide how many robots they can afford to have in their system, and obviously, then they have to think about which surgeons or which procedures get preferential treatment or preferential use of that robot. So it's not just a function of the suppliers, the companies being able to manufacture enough robots, it's an affordability issue for healthcare systems.

**Max:** Got it. That makes sense. And so who are the key players in the market today?

**Matt:** Yeah, well, and any conversation about the key players in the market really starts and stops with Intuitive Surgical because they are absolutely the 500-pound gorilla in this space, there's no doubt about it. They created this market, I think they launched their first surgical robot in year 2000.

So they've been in it for over 20+ years. You've got other meaningful players that are coming into this space like J&J and Medtronic, two of the largest med device companies in the world. You've got other smaller players like Asensus Surgical with their Luna system. You've got CMR, it's out of the UK, and they have a system called Versius Moon. It was just these kind of a scaled down system, almost like a surgical assistant. And then you've got other companies like NOAA Medical that have a specific endo-luminal robotic system for bronchoscopy procedures.

# Market Overview



**Matt:**

But again, any discussion about surgical robotics and who the main players, it's all about Intuitive Surgical. They have a huge lead in the space. But I will say any conference you go to these days, you're seeing more and more companies that are trying to get into the space because it's so attractive. And specifically, you see a lot of adoption. You see a lot of innovation coming out of China now.

These Chinese companies have a lot of capital behind them, and they seem to be innovating at a much faster pace than some of the large nationals that I already mentioned. So there's going to be more competition space, but it is dominated today by Intuitive Surgical.

And I think when you think about this space, it is so attractive and you say, well, why is Intuitive Surgical just such a large piece of it? It's a really difficult system to launch, and these are extremely complex systems.

It takes years to develop, takes a huge amount of investment. These are massive investments, and then the regulatory path is not easy. So the barriers to entry, not just because Intuitive's got such a foothold, but the barriers to entry into this space are pretty high.

**Max:**

Awesome. That's super helpful. I know Intuitive had an earnings call recently. Have you been listening to those? Any key takeaways?

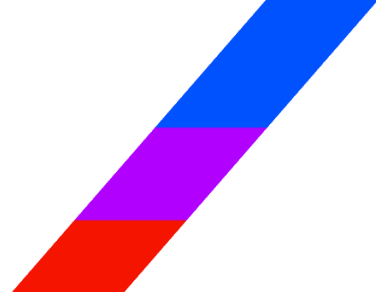
**Matt:**

Oh yeah, no. If you listen to the Intuitive earning calls like myself and many others, do you walk away just realizing just what a strong company they are. So they had another really, really strong quarter. I think their year-over-year quarterly growth and procedures was 18%, which surgical procedures are not growing at 18%, right?

So what's happening is you have this underlying growth in surgical procedures based upon the demographics and in the aging population. But what really drives the growth for Intuitive Surgical is the transition from procedures that were done open or laparoscopically to robotically.



# Market Overview



## **I Matt:**

And that's really why you see Intuitive growing at 18% in the traditional med tech companies that play in the open and laparoscopic space growing at three to five, maybe 6%. So there's a huge difference. And I thought something was really telling in their call, they've done 16 million procedures to date.

So they've been in this business robotic surgery for about 24 years, 16 million procedures to date. 10 million of those have come in the last five years alone. So it's pretty amazing how fast their procedural volume has really ramped up. They had some good discussion about their new system five.

They recently launched yet another multi port robotic system, their system five, and talked about some of the improvements. They got a lot of questions from analysts about that, and they're getting some very good feedback from customers on that system.

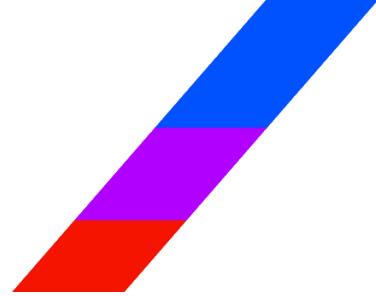
From a financial perspective, they did lower, I should say, they did raise their expected growth. So every company provides an expected growth range. I think Intuitive's was around 15 to 17%. They raised the lower end of that projected growth rate. So they obviously see very good things there.

So all in all, it was a very, very solid earnings call and they saw a really nice jump on their stock post call. I think it jumped about 10% over \$500. I think it's trading about \$512 today. And if you think about that and you go back and say, okay, they've got 10 million procedures of their 16 in the last five years, which made me think about five-year total stock returns and how they're doing versus other companies.

So if you think about how well they've done in terms of total stock return over the last five years, Intuitive's delivered about 180% growth. Now, if you compare that to some of the other really large med tech companies that are in the same space, not necessarily robotics, but other large med tech, med device companies, Boston sign about 107% over that same timeframe, really well-run company.

Stryker about 76. J&J, direct competitor, 44%. Medtronic, negative 1%. So I say that because it shows just how much they've outperformed the best in class companies in med device, med tech over the last five years.

# Market Overview



**Max:**

Okay, that's really helpful. What are the KPIs used by Intuitive to outline how much better robotic surgeries are? There's this 18 million surgeries number, but that's 18 million with X KPI of post-op patient recovery, X KPI of anything going wrong in the surgeries. There's another dimension here to just volume, which is quality of outcome. How do you think about that?

**Matt:**

Yeah, any med device company will try and point to both clinical economic outcomes to say, this is why this device should be used or why it's better. And I think Intuitive is trying to do the same things. They're trying to prove that a robotic system or robotic surgery is better than traditional laparoscopic or open procedures.

One, let's take open out because we know that's a completely different animal. But what their point is when you compare traditional laparoscopic procedures to a robotic procedure, they're going to talk about better patient recovery. They're going to talk about less blood loss. They're going to talk about a faster recovery time, decrease risk of additional hospital stay. They're going to talk about a decrease in the conversion rate.

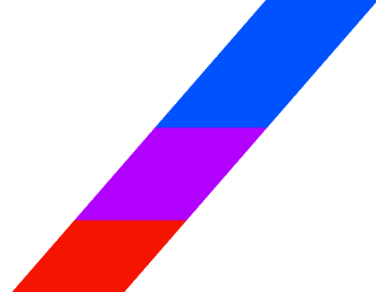
What a conversion rate is, if something was to go wrong in a laparoscopic or robotic procedure, you're going to have to quickly convert that patient potentially to an open procedure and they'll highlight and they'll talk about the lower conversion rates from robotics to open versus traditional laparoscopy.

So they talk about complications, they talk about patient recovery, hospital stay, conversion rates. Those are some of the KPIs that they'll talk about for the difference between robotic surgery and traditional laparoscopic surgery.

**Max:**

Got it. That's helpful. So Intuitive is the front-runner, it's a big market, how would you define the lower bound and upper bound of the market growth rate applied to that 9 billion over the next five, 10 years?

# Market Overview



**Matt:** Well, they've been growing at that 15 to 20% clip over the last five years. And then you have to ask yourself can they continue to do that?

**Max:** But sorry, that's Intuitive, but what about the market?

**Matt:** Oh, well, essentially, Intuitive is essentially the market today, right? Because J&J doesn't have their system out yet. Medtronic has launched their robotic system, but it's only outside the US and I would say still in early launch phase. So when I talk about the market for better or for worse, it's really Intuitive today because everyone else in this space is a rounding figure from an economic or a financial perspective.

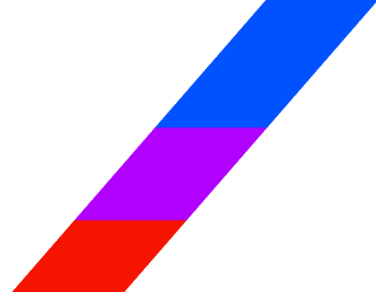
So if you think about what's going to drive the growth for robotics, there's really two things, continued growth in surgical volumes. So if you say growth in robotic surgery is a function of two things. One, it's a function of overall surgical volumes. Two, the transition from open and laparoscopic surgery to robotics.

So those two things are fundamental to the growth. You have to say to yourself, well, I don't see surgical volumes potentially dropping because again, the prevalence of some of the disease states out there as well as the aging of the population doesn't really lead you to believe that you're going to see a decrease in surgical volume.

And then if you think about the transition from open and laparoscopic to robotic surgery, you ask yourself, well, have they penetrated the market as far as they're going to go? And I think that one is a big, hard no.

When you look at the penetration of robotic surgery, and you look at the most penetrative market in the world, which is the United States, my estimates today in the core procedures that they target, which are things like hernia, hysterectomy, sleeve gastrectomy, colorectal procedures, prostatectomy, and a handful of others, they're only about 30% penetrated in the US, right?

# Market Overview



**Matt:**

So you've got a huge opportunity to continue to penetrate those core procedures even in their most penetrative market in the world. Now, you step outside the US and you go to your next two largest markets from a developed market perspective, you've got Japan and Europe. Those markets are somewhere between five and 10% penetrated for robotics in those same procedures.

So you got a huge opportunity in those next two very large markets. And then you go outside those big three, which those are probably 75% of where most procedures are done. You start getting into the emerging markets, China, some of the other markets, again, you're talking one to 3% market penetration.

And fundamentally, if you believe surgical volumes are going to continue to grow, if you believe that the migration from open and lap to robotic is going to continue, and you believe that you haven't nearly come close to the penetration rates where I think you'll end up, you've got a lot of runway to grow in robotics.

**Max:**

Got it. That's really helpful. What about emerging markets?

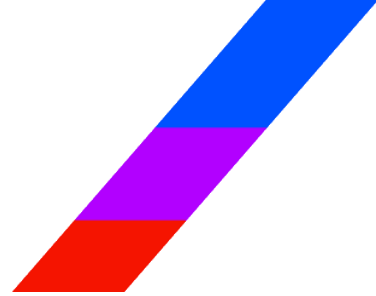
**Matt:**

Yeah, that's a huge opportunity, emerging markets, because I think I said there's probably less than 5% penetration in those emerging markets, and I think there's wide open opportunity, but I think there's a couple of things there that are interesting about the emerging markets, well, several.

One is just the pure size and scale of the opportunity. Two, I think the emerging markets will offer an opportunity for new market entrants to get in there where Intuitive isn't so entrenched.

So I think not only is it interesting because at the low penetration rate, but I think you'll see companies target the emerging markets because they don't have to go head-to-head with a large installed base of 10,000 robots like they would in the US.

# Risks & Opportunities



**Matt:**

And so I think that's interesting, and I think just quite frankly, there's just so much opportunity out there that you're definitely going to see that continued opportunity in the emerging markets. But in the emerging markets, the thing that you really have to address in my opinion, is the affordability issue.

So healthcare systems in the United States, and to a lesser degree, Japan and Western Europe are able to make these 2 million investments in a large robotic platform. You get into some of these emerging markets, right? It's going to take a little bit more affordable system to really drive penetration because you're just not going to have the ability to put multiple robots in a hospital for \$2 million each.

**Max:**

Got it. Got it. That's really helpful. Moving on, Matt, to risks and opportunities, what are the big risks or headwinds you see to this industry realizing its potential here?

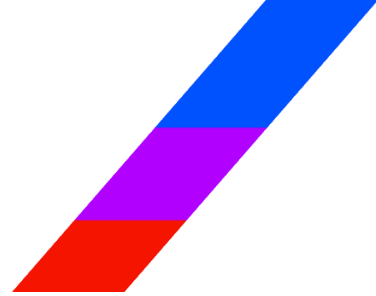
**Matt:**

So I'll go back to what we talked about Max, in terms of what drives this business, underlying surgical volume, transition from open and lab to robotics. Those are the two big things, and there's new markets can open and so forth, but it's just those two pieces.

So what are the risks? Well, I don't think you're really going to have to worry about the risk between the transition from open-end lab to robotics because we've proven over the last 20 years that surgeons and patients will benefit from that. In my opinion, there's no doubt robotic surgery is better, and I think they've proven that both clinically and just based on their adoption rates.

So you have to ask yourself, okay, then if it's not the transition, is there risk in surgical volume? And I'll give you an example where while you think about the disease states and the patient population are going to continue to drive that, if you come up with other therapies to treat some of these disease states that take patients out of the surgery care pathway and put them into, say, a drug pathway, you see some of the fundamental surgical volume erode a little bit.

# Risks & Opportunities



**Matt:**

I'll give you a specific example. So you think about bariatric surgery. And bariatric surgery has been a growth driver for both laparoscopic and robotic procedures for many years. And people go to these procedures because they're trying to lose weight. So they turn to procedures like a sleeve gastrectomy to try and lose weight.

And essentially, the procedure essentially removes about 70 to 80 percent. It's a very safe and effective surgery for weight loss. And that was driving a lot of growth for the med device companies and laparoscopic instrumentation as well as for Intuitive in the multiport robotic platforms.

Now, along come the GLP-I drugs in what you see, there is a lot of people who have now opted out of the surgical pathway and into the drug treatment pathway or the GLP-I pathway. And so where bariatric surgery was a big growth driver for surgery in that space, now all of a sudden over the last two years, you've seen surgical volumes decline and even go negative.

So if you see more treatments or more opportunities to take procedures out of the surgical pathway or take disease states out of the surgical pathway and turn them into the pharmaceutical or drug pathway, that's a risk.

Now, do I see that as a huge risk? No. But if you had asked me five years ago if you thought GLP-I was going to take over bariatric surgery, I would say no. So you have to be conscious of that's one potential disruptor.

**Max:**

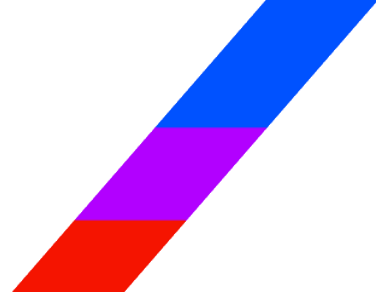
Yeah, that's interesting. So the competition comes from not within surgery, it's the actual decision to have surgery.

**Matt:**

Yeah, it's an elective surgery. So it's not that you're going to see less people that have morbid obesity, but you're going to see different treatment pathways for those patients.

And now, you get into some of the cancers like colorectal cancer or lung cancer, those might be a little bit more difficult to treat. But again, as you see the evolution of therapies versus surgery, that's something you have to keep an eye on.

# Risks & Opportunities



**Max:**

Got it. That's really helpful. How would someone evaluate a medical robotics company? What are the key things to look at from an investor's perspective if that company is well-positioned facing some of these risks or poorly positioned?

**Matt:**

Yeah, I think you'd look at a lot of the same metrics, you look at for any company. You look at what's the market look like, what's the total available market versus the served market. You'd look at the competitive landscape, who's already in that space? Is it an Intuitive system or is there a smaller third party or a small player or third tier robotic system in that market? What are the barriers to entry?

So if I go out and I create a new market, one of the things I always think about is, okay, I've gone out and created a new market. Maybe I developed a new robot for a specific procedure that hasn't been addressed by the big players today, but what are the barriers to entry?

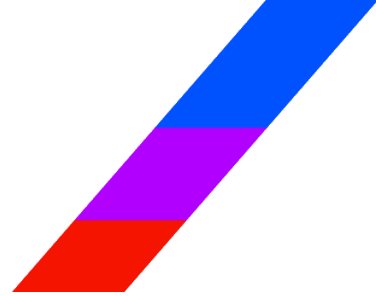
So once I create that space from an investment perspective, I have to think about how hard is it for somebody else to come into that space. So barriers to entry when you assess the value of a company or assess the value of a market is another one. So I would say there's not wildly different than just about anything else.

Robotics doesn't necessarily say it's wildly different than other markets. Size of the procedure volume, which is obviously the size of the market, competitive landscape barriers, adoption rates, projected adoption rates, regulatory pathways, all the things that you would look at in any med tech med device market.

**Max:**

Got it. That's really helpful. Is this a winner-take-all market? I mean, you explained earlier that emerging markets and places where Intuitive isn't already entrenched as an opportunity, but I guess within a market where there's already a player, a first mover, does it tend to be winner-take-all, or will it turn out to be winner-take-all in your view?

# Risks & Opportunities



**Matt:**

Yeah, I think that's a question a lot of people are asking because to date, it has been a winner-take-all with Intuitive, basically owning the market for the last 20 years. But I don't think it'll stay this way long term.

I do think Intuitive will continue to be the far and away market leader, but the market is just too attractive to not take a winner-take-all, and you're seeing so much investment by the big large multinationals, so much investment by smaller startups trying to find a little niche into this space.

A lot of investment in China as I mentioned earlier, where there are a lot of new platforms popping up and their ability to innovate at a much faster pace. So I think it will not be a winner-take-all, but I do think anybody choosing to go head-to-head with Intuitive is going to have a very, very difficult task ahead of them.

But again, it's just you're too early on in the adoption curve of robotics. Again, think about globally, you're in that three to 5% penetration rate, and it's so attractive, you look at, as I mentioned, the returns on Intuitive stock. It's such an attractive market in terms of where you are in the adoption curve or the penetration curve.

And Intuitive has proven that robotic surgery is beneficial and better. So I just think you're going to get so many people investing in it. It won't be a winner-take-all, but everyone's going to be fighting Intuitive. They're not going to give up their leadership position anytime soon.

**Max:**

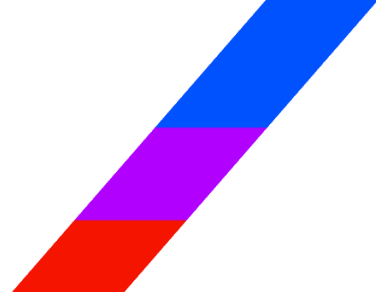
Got it. That's helpful. Okay, moving on to key industry players. And maybe just double clicking on this a little bit. If you were advising challenger companies, what would you suggest on how to take on Intuitive Surgical?

And there's a variety. It's not always obvious that being a first mover is advantageous because the first mover tends to have to do a lot of work to teach the market about whatever they're doing. And as a second mover, you can ride in that wake when people are already familiar with it, and maybe you have a cost advantage or a specific vertical or a specific type that you challenge the incumbent in.

Curious how you would advise smaller challenger companies given Intuitive's first mover advantage?



# Key Industry Players



**Matt:**

Yeah, and I think especially in the tech industry, there's littered with first mover advantage that didn't necessarily play out and bigger companies took over a market leadership position. But I have to say that trying to compete with Intuitive after a 24-year head start is going to be really, really difficult.

Let's think about why that is. They have great technology. They've got an installed base of probably 10,000 robotic systems and they spend close to a billion dollars a year in R&D. That's a massive number that most companies are going to struggle to come near.

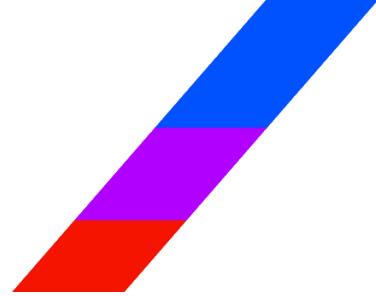
So on top of that, and again, followed this company for years, they're a really well-run company. They're performance-driven culture. They've got excellent balance. So it's going to be a real challenge going to head with them. But again, there are opportunities for other companies. And so if the question is, if you were advising a company, what would you do?

And my advice is I wouldn't go to head-to-head with Intuitive, but there are some opportunities out there, and I think I touched on some of these, but we'll go maybe double click on it. As I mentioned, outside the US, the market is wide open and because the penetration of robotics outside the US is exceptionally low and Intuitive has, in my opinion, intentionally really focused in the US.

So if I was a new startup or a new company looking to get into the robotic platform, I'd start thinking about what markets other than the US can I go after because Intuitive doesn't have that large foothold. And the foothold, or I should say that install base is really important, Max, because if you think about it, so let's say I'm a hospital system and I have five robots in my 20 ORs, do I want to bring in another robotic platform? Do I want to introduce two different robotic platforms in my same hospital?

So standardization is really key when you do surgery, variability is like your nemesis to clinical outcomes. So do I really want to go in and have a second robotic platform? And I think that's the challenge that companies are going to have in the US because there's so many installed Intuitive robots, it's going to be a difficult value proposition to get a hospital to bring in a second one. .

## Key Industry Players



**Matt:**

So I focus in the OUS markets, outside the US. There's another area that is interesting, and it's been growing for a long, long time, is the non-acute care market. So more and more procedures... Had a friend who just had, they were hip done and they were in the outpatient surgery center and out the next day or out the same day.

It's amazing the number of procedures that are done in these outpatient surgery centers. Now, Intuitive doesn't have a massive foothold in outpatient surgery centers. So this non-acute care segment of the market as another interesting space where companies could innovate with a smaller, more appropriate robotic platform for the non-acute care setting.

So again, those are just two markets. We can talk about procedures and so forth, but I think the OUS and the non-acute care market probably offer a really good opportunity for companies to come into that space. And so my overall advice would be I would not take on Intuitive head-to-head in the US, look where they're not firmly established and go there.

**Max:**

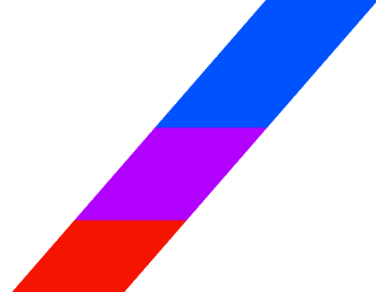
Got it. That's helpful. Can you help us understand how sticky this installation means? What does having the robots installed mean? How long does that take for a hospital system? Is there software that then gets used across the organization? Is there then onboarding time and teaching time for the software? So these are all traditional dimensions that increase stickiness, and it'd be helpful to understand those as applied to Intuitive.

**Matt:**

Sure. And so everything you said, Max, I would say yes too. So first off, again, would you prefer to have five similar systems that surgeons could walk into any of those five ORs and know the system and use it? So there's the standardization, the comfort with the system, so that's next.

Sometimes you don't see hospitals deviate capital equipment specifically across different rooms. That's just not how hospitals traditionally work. So there's some stickiness there for just pure standardization.

# Key Industry Players



## ■ Matt:

Then to your other points, think about instrumentation. If I have two platforms in my ORs, I have to carry two different sets of instrumentation because remember, the robots themselves all have robotic arms, which you attach the instruments to.

So I've now got to carry two different sets or maybe three different sets depending on how many robotic platforms you have of instrumentation, which again, you're talking about ordering, warehousing and maintaining different types of instrumentation, which may in fact have different sterilization requirements, different handling.

How many times can you use company A's instrument versus company B's? So it adds a level of complexity from an instrumentation perspective. And then the last piece, again, there's a lot to think about there, but the last piece you think about is service and maintaining these very, very expensive robots.

Now, if you look, Intuitive's revenue is probably somewhere around 15 to 17% of their top line revenue. So service is a very important piece. You think about that, do you, as an administrator or a hospital administrator, want to have different service contracts? Do you want to have a service contract that covers three of these robotic platforms and two over here, or do you want to have all of those combined under one service umbrella?

So there's obviously some benefits to there. And then the one thing you mentioned, it's just the training piece, right? Once you adopt and get trained on a system, switching systems, Tuesday, you've got company A's robotic platform, Thursdays, you've got company B's, it's not as seamless because the training and the comfort with the system, there will absolutely be differences with the system. So going back and forth between different systems is not ideal, in my opinion.

## Key Industry Players



**Max:**

I see. Fair enough. Do you think Intuitive is charged... Is it possible that challengers come up with cost advantages because presumably there's a price to switch, right?

And so the question is, is Intuitive going to choose to price as much as they can and capture whatever margin they can even if that means losing deals to well-funded challengers who can lose money on the initial installation and only recoup it much later on through customer lifetime value or...

Yeah, I guess what's your intuition on the strategy for Intuitive with regards to pricing and is it possible that there's an opening around a cost advantage that can help incentivize existing Intuitive to switch?

**Matt:**

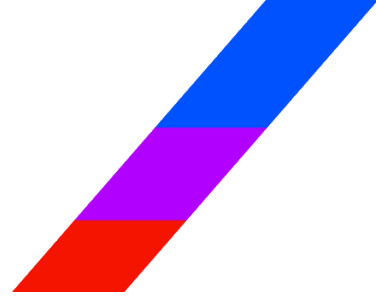
Yeah, absolutely. Short answer, yes. Is there an opportunity for new market entrants to come in and offer a lower cost more economical system, whether that be the upfront capital costs or the per procedure cost? Because again, remember you have to pay for the capital or lease the capital upfront, then you have instrumentation that's used in a procedure.

So is there an opportunity for companies to come in and say, hey, we're going to save you half a million dollars on the initial capital acquisition because our robotic system is less expensive and we're going to take your cost per procedure down by 25% because our instrumentation can be used instead of 10 times, 50 times, instead of 50 times, a hundred times, so forth and so on.

So there's absolutely an opportunity for companies to come in and make an economic play in this space. There's no doubt about that because quite frankly, I think Intuitive has done a nice job trying to make their system overall per procedure attractive.

But again, they're the only game in town, so they really haven't had to worry about somebody trying to undercut them from a price perspective. So I think when you see the large multinationals get into this space, that's exactly one of the areas that they're going to apply. They're going to go after and say, look, we not only can provide a clinically equivalent robotic platform, we can do it for X percent lower.

# Key Industry Players



**Matt:**

And I think you even heard some of the large multinationals. So when you think about open versus laparoscopic versus robotic procedures, open procedures by and large cost less per procedure. Now, hospital stay for the patient is longer, but the instrumentation is less expensive than a laparoscopic procedure.

When you go from laparoscopic procedures to robotic procedures, your instrumentation costs go up. So your costs per procedure increases as you move along that surgical pathway from open to lap to robotics. What you've already heard some, if you follow the large multinationals, talk about the opportunity to do robotic surgery for the same price as laparoscopic surgery.

So they're already trying to messaging to the market even before they're there that they can make robotic surgery as cost-effective or as on parity from a laparoscopic approach versus that X percent increase as you move to robotics.

**Max:**

Got it. That's helpful. Sorry, do you mind just clarifying for the record, the difference, the step between laparoscopic and robotic, tangibly? So there's open, there's invasive, then laparoscopic, then robotics, and so what's the nuance between laparoscopic and fully robotic?

**Matt:**

Laparoscopic, the surgeon is standing in the surgical site over the patient using laparoscopic instruments. Again, minimally invasive surgery, but they're not using 3D enhanced visualization.

They don't have all those things I talked about at the very, very beginning that make robotic surgery different than laparoscopy, the visualization, the removal of any tremors or shake, the ergonomics of comfort and so forth. So they're both minimally invasive surgery.

From a patient perspective, you really don't benefit one way or the other because theoretically, you're having minimally invasive surgery. But again, those other things I mentioned in terms of why robotics seems to be taking so many procedures away from laparoscopy is the things I outlined.

# Key Industry Players



**Max:**

Okay, perfect. And you alluded to something that I think is worth spending a touch more time on that the higher cost per surgery of robotics, but can you help understand the fixed cost versus variable cost component? I think that may be helpful to digest here. That kind of plays into the stickiness story.

But basically, based on what I'm hearing, it sounds like robotics would be a lot of upfront cost for the equipment to set up and, of course, the training. But then the marginal nth plus one surgery, is it that expensive?

Is there marginal cost related to a robotic surgery other than the surgeon's time, which would be a cost in all three surgery types. Could you help us understand that breakdown of fixed versus variable and then the marginal cost for robotics versus laparoscopy?

**Matt:**

Yeah, so let's categorize it this way, Max. Let's talk about the fixed cost of the capital equipment required to do laparoscopic or robotic surgery, which is like a one-time purchase that you need in that room to do the procedure.

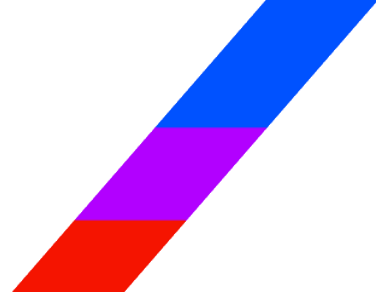
And maybe the variable cost in terms of the cost per procedures on the instruments that are used that are often single-use or multi-use, but eventually get used up, and those are the kind variable costs. Can we agree on those kind of buckets?

So laparoscopic surgery requires what we call a laparoscopic tower. It's going to have the inflation system, it's going to have the visualization system, the camera system, it's going to have a couple of TV monitors, it's a tower of Apple equipment, and you're going to roll that in the room.

And that tower might be depending on, again, there's a lot of variability depending on what system you use and what part of the world, but so forth. But let's just say that that tower could be somewhere between 30 to a hundred thousand dollars.

It's not a massive investment from a hospital perspective, and you're going to have multiple towers because laparoscopic surgery is so prevalent that you're going to have a lot of those towers and they're going to be standardized. Typically, you might have a Stryker tower or a Storz tower or some other towers, but it is that system of capital equipment needed to do a laparoscopic procedure.

# Key Industry Players



## **I Matt:**

So now contrast that with a robotic system. Robotic system, you're going to have the same tower with all the capital equipment, the visualization, installation, all that. Then you're going to have the surgeon console, which is where the surgeon sits off to the side of the room, in the corner of the room.

It can actually even be done remotely these days, but think of that surgeon sitting off to the side in an operating room and he or she is seated seating a nice chair, and they have a console where their hands and feet are controlling the robot. So that's the second piece of capital equipment.

And then of course, the biggest piece is the actual surgical robot, which is up on the surgical site over the patient and will have, again, depending on the system, three to five robotic arms with instruments attached to those. And that is going to be a very large robotic system.

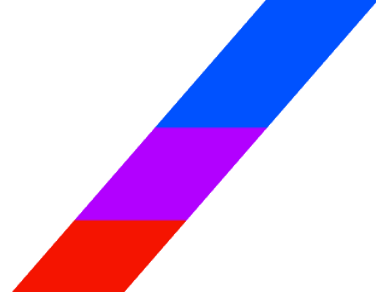
So the cost of that robotic system today, if you look at the Intuitive, whether it's the XI system or their new system five, it is somewhere between a million and a half to \$2 million probably, right? So the cost to set up to do these procedures in terms of your upfront cost, your capital cost, your one-time cost, is huge compared to lap versus robotics.

Now, that said, I think Intuitive did a very smart thing a few years back as they started to see competitors coming into this space, they started offering a variety of capital acquisition models. So trying to get a larger installed base before some of the larger multinationals, larger med tech companies come into the space.

They try to really push as many robotic systems into the market. So instead of requiring customers to come up with that million and a half to 2 million per system, they offered a lot of variety of capital acquisition programs, lease options, paper use, and so forth.

And so this allowed hospitals to get out of that giant CapEx spending where they had to come up with that much money on the front end, and they can move into more of these financing models. Same thing that other industries use, for example, the automobile industry. So they balance that out a little bit with these new capital leases and so forth.

# Key Industry Players



## **I Matt:**

So that's the difference between the setup costs or the one-time capital costs for laparoscopic surgery versus one-time setup costs for robotic surgery. Then you go into the instrumentation. In laparoscopic surgery, the surgeon is on the serial field with an assistant, and there's probably one of the other, maybe a resident there as well.

So you have two to three people at the surgical site, and they're using a variety of devices that go through the ports into the patient. And these devices, graspers, dissectors, stapling devices, advanced energy devices, these are all used across a variety of procedures. And many of these are single use devices.

So they'll use them in a procedure and then they'll get put in the red bag with the big biohazard tag on it and single use, and they're gone. Some of the devices that they'll use will be reusable and they'll be taken out and sent down and cleaned and re-sterilized.

Some of them have a limited life cycle where you can use them maybe five to 10 times, but your instrumentation, your cost, your real cost on laparoscopy is your instrumentation that you throw at your single use devices. Pivotal to robotics, now, your instrumentation is not single use.

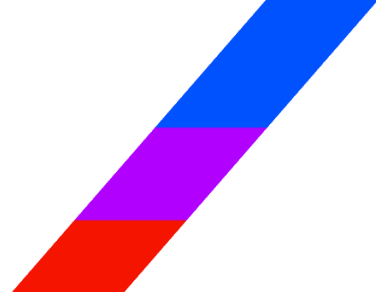
So you have these robotic arms and they're company, they're good for X number of uses, but again, they're proprietary to that robotic system. So in laparoscopy, one of the things that is different is a surgeon can decide whether he or she wants to use a J&J or a Stryker or a Medtronic or Applied Medical. They can choose the device that they want to use in laparoscopy.

When you pivot and move to a robotic platform, you're limited to whatever instrumentation plugs into that robot. Now, the caveat there is if you really don't like the instrumentation that comes with the robot, you can get off your chair away from the console where you're sitting on the side of the room, you can get gloved up and down and go to the sterile site and fire or use whatever instrument you want.

But most surgeons don't choose to do that. It's not an efficient workflow from an operating perspective. So surgeons will tend to always use the instrumentation on the robotic platform. And just because it's proprietary, it usually comes at a higher cost.



## New Tech – Next-Gen Procedural Areas



**Matt:** So if you think about the cost per procedure from an instrumentation perspective, laparoscopic versus robotic, robotic procedures tend to be more expensive just because the nature of their more complex devices, instruments on a robotic system and they're proprietary.

**Max:** That was in depth. That's what we were looking for. Okay. Final section here, Matt, for the last 10 minutes. What about data analytics? How important are analytics and is there an analytics component that is enabled, thanks to robotics surgeries?

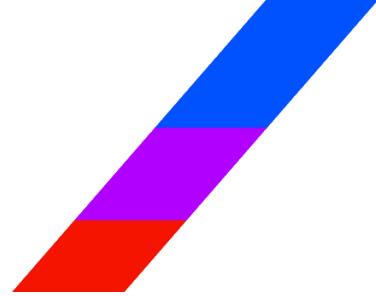
**Matt:** Yeah. Wow, that is a million-mile wide question, Max, and it's a great question, but there's so many different directions you go with it. So I'll give you my two cents on it and we can maybe spin in a different direction if you want. But data analytics is a massive opportunity.

And so think about how you improve in just about anything. It doesn't matter whether it's surgery or baseball or whatever. You learn through repetition and analysis. If you do things over and over again, you tend to get better at it, at least there's the hope that you would.

And the other way you get better is you go back and you analyze the outcomes and try to learn how to get better at it. So repetition and analysis is really how you improve and just about anything. And again, surgery is no different. Surgeons, theoretically, of course, they get better, is they do more and more surgeries.

First thing anybody says, "Hey, Matt, what surgeon would you use to go do this?" I always tell them, find the surgeon that does it all day every day, and that's all they do, because theoretically, given the volume of procedures they've done, they should be better than somebody who does it every Tuesday or Thursday, one procedure at a time. So that's first thing.

## New Tech – Next-Gen Procedural Areas



### **I Matt:**

Then as they gain more experience through procedures, they're going to analyze and they're going to figure out how to get better. And the way they do that today is they get together with their fellow surgeons at that hospital and they sit down in the departmental meetings. Maybe the colorectal team gets together or the gynecology team gets together and they talk about cases and they discuss them at their surgical staff meetings, and they talk about what they learned and how they can get better.

But again, that's limited to the number of people that are at that meeting. And then maybe a third way, they go to surgical conferences and they sit and they listen to experts talk about how to do procedures. They meet with peers and they try and learn how to improve.

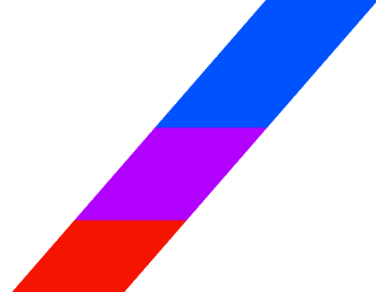
So again, all they're trying to do is improve their skills as a surgeon. So the opportunity in my head with data analytics, especially integrated into robotics, is the opportunity to really accelerate the learning and the proficiency curves for surgeons. So think about that.

If I can learn faster and I can become more proficient, I'm going to get better outcomes from my patient. So the idea of embedding strong data analytics into these robotic systems with really strong computational power is you can collect information from literally thousands if not millions of procedures to help physicians learn faster.

So remember we go back, that surgeon finishes his or her procedure, and then they have their monthly meeting with their department, and they maybe talk about a couple cases, and their conversation stays there. Here, you've got access to, like I said, thousands or millions of procedures that can help you learn faster. And that's proven, there's no doubt about that.

In addition, thinking about accelerating the learning and the proficiency curves, the data analytics is also going to start taking a larger role in terms of pre-op planning. So when you think about a surgeon's ability to say, I'm going to take that patient's CT scan and we'll feed it into this robotic system, and it's going to take a similar procedure plan or a CT scan for 2000 other patients that have this procedure, it's going to help you develop your pre-op plan, that personalize, here's where you think you're going to want to do, here are your lines of dissection, here's the approach you're going to want to take, here's the instrumentation you want to use. So I think there's a big opportunity in the pre-op planning piece.

## New Tech – Next-Gen Procedural Areas



**Max:** Sorry, just to double click, Matt, this is not available in laparoscopic, right?

**Matt:** Not necessarily. There's companies that are trying to get into the laparoscopic space, but again, the big difference is, Max, a laparoscopic system, for the most part, it's not a fully integrated system. You've got company A's devices and company B's installation and company C's, electro-surgical systems.

So it's not a fully integrated system that talks to each other, and that's one of the beautiful things about a robotic platform. It is a self-contained ecosystem that is the console for the surgeon. It is the robot over the patient. It is the tower with all the equipment in there, and it's fully integrated and able to talk to each other.

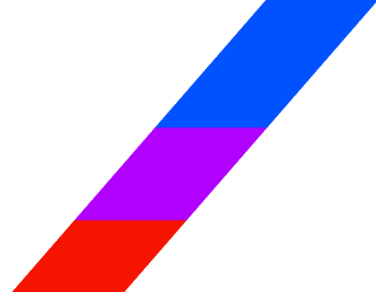
So that is one of the biggest advantages of having a standalone robotic ecosystem versus a decentralized, laparoscopic system. Does that answer your question? Is that helpful?

**Max:** Yeah, that's helpful. Yeah. Yeah.

**Matt:** So then you go back to the data analytics piece. So you got this opportunity to do better pre-op planning, but then again, it's got a lot of information that it can help not only pre-op from a planning perspective, but it can start providing real-time, intraoperative feedback to surgeons.

So if you think about this, when a lab coli is done or a colon section is done, you're going to come across a lot of the same anatomy. So if you know that there are critical structures like the uterine and you want to make sure that you don't hit a specific artery or a critical structure, robotic systems are developing, we're not there yet, but they are developing the ability to give surgeons that, hey, guess what? We are pretty close to this critical artery or this critical structure.

## New Tech – Next-Gen Procedural Areas



### **Matt:**

You want to make sure your planes of dissection stay away from that, and that can happen in real time. And that's again, one of the big benefits of robotic surgery, that when you start collecting this massive amount of data into an integrated ecosystem of a robotic platform, it can provide that intraoperative feedback to surgeons.

And that's just going to lead to better outcomes because surgeons will make less unintended mistakes during surgery because they'll have the collective wisdom of all those procedures and the AI system that is built around these robotic platforms to provide all kinds of insight intraoperatively, which you think about what's the benefit, less unintended patient injury. Hopefully, if you think about better planes of dissection to get to the target area, maybe less blood loss.

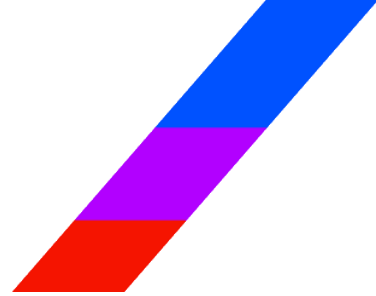
So there's other areas where this bank of information that a surgeon can pre or intraoperatively is really going to benefit not only the surgeon but the patient. And again, Max, that is really an exciting area. It's so new and it's really not there yet. I think if you look up and you look at the Intuitive system five, they're very smart.

They've embedded a lot of this technology and whether it's AI, whether you want to call it machine learning, but the ability to collect a lot of information and provide surgeons, but they're so early on, I think Intuitive, again, not to blow their horn, I sound like a mouthpiece for them, but they're being very thoughtful and smart about it with a limited rollout, and they're collecting a lot of feedback because they want to see what they can learn and more importantly, what surgeons will use and they have to learn how to monetize it. So there's just a lot of opportunity here, but it's very, very early on.

### **Max:**

Got it. Last point, anything you want to add in terms of next gen opportunities for robotic surgery in your last two minutes here, just to wrap, that we haven't touched on?

## New Tech – Next-Gen Procedural Areas



### **Matt:**

Yeah, some of the next, I think, and again, this is out there already, but it's very, very early. You talked about early stage for multi-port soft tissue robots. There's the flexible endo-luminal robotic opportunities, both J&J with their MONARCH system and PUDA has their Ion system.

But I think that's an area that they're both super early on, and I think that's an area for next gen that you could really look at and say, that's going to open up a whole bunch of new procedures that are not being addressed with the multi-port.

And again, you think about vectors for growth, transition of procedures from open to lap, underlying surgical volumes, further penetration in core procedures, and then expanding into new markets. And I think when you look into the endo-luminal robotic space, it gets you into new procedures. It gets you into a different type of platform.

It's an exciting area, and I think it holds the possibility of moving from where it is today, which is primarily a diagnostic tool doing lung biopsies or biopsies in the lung space into not only a biopsy tool, but a therapeutic tool where the same endo-luminal robot could not only go in and take a biopsy to determine what stage level of cancer that is, but then if necessary, going and deliver the treatment during that same procedure.

So a patient literally could go under a single anesthetic event and not only get diagnosed, but potentially also get treated. And today that doesn't happen, but I think that's where that market's going to go, and it's an exciting space.

### **Max:**

Awesome. Well, Matt, thank you so much for your time. This is exactly the kind of insight we were looking for. I can't think of a better person with whom to have this conversation, so we really appreciate you sharing 60 minutes with us, okay?

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