Small Incision, Big Impact.
How Minimally Invasive Surgery Improves Outcomes

By: Bob White, President of Minimally Invasive Therapies Group at Medtronic

As health system leaders navigate an evolving global healthcare environment, they’re embracing new ways to improve patient outcomes and their bottom line. Those two goals aren’t mutually exclusive.

The advancement of surgical techniques and technologies is providing real patient benefits, while reducing the cost of healthcare for all.

Bob White shares how positive change occurs when patients have access to minimally invasive surgery (MIS), and how best practices to adopt MIS provide a compelling — and necessary — path forward.

Open surgery remains the standard of care around the world — but that needs to change. Minimally invasive surgery (MIS) is a far better option in many cases.

When referring to MIS, it’s not inclusive of all surgeries from head to toe, but rather laparoscopic and thoracoscopic procedures in the abdomen, pelvis, and chest, spanning general, gynecologic, colorectal, and thoracic surgical specialties. Of the 50 million surgeries performed annually in these areas, 60 percent are done through an open approach1 and that’s too many.

In open surgery, surgeons make an incision large enough to place their hands inside to address the diseased tissue. With MIS, however, the surgeon uses only a few keyhole incisions, long/thin instruments, and a laparoscopic camera.

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When comparing open surgery to MIS, patients can experience costly higher rates of complications, longer hospital stays, increased blood loss, and higher readmittance rates.2–4 In other words, everyone — patients, payers, and providers — pays more for less optimal outcomes.

It doesn’t have to be this way. MIS significantly improves outcomes at a lower overall cost.2

This is backed by an abundance of evidence, including a budget-impact model study performed by Milliman, an independent actuarial firm. Milliman’s staff looked at 46,386 surgical cases from a commercial payer perspective and found the savings for MIS in laparoscopy and thoracoscopy were5:

- $12,989 for thoracic resection
- $10,204 for colectomy
- $3,721 for ventral hernia repair
- $1,174 for non-cancer hysterectomy
A study in *JAMA Surgery* supports this data. It states that MIS approaches offer compelling near-term and long-term cost savings for the healthcare system and less trauma for patients.\(^6\)

The study outlines how expensive surgical complications can be — with an average cost to the payer of $18,500 per case. Open surgery patients were reported as being hospitalized for 7.4 days, while laparoscopic and thoracoscopic patients were discharged after only 4.5 days. This resulted in the total procedural and hospitalization cost of care for minimally-invasive approaches to be 23 percent less on average.\(^6\)

**TREMENDOUS CLINICAL VALUE — ACROSS SPECIALTIES**

MIS offers remarkable clinical value, too. Dr. Martin Makary, a surgeon from Johns Hopkins University and a *New York Times* bestselling author, has a firm opinion about MIS. He believes “the strongest predictor of a great surgical outcome is the use of laparoscopic surgery by a skilled MIS surgeon.”

Dr. Makary’s sentiment is underscored by peer-reviewed studies across surgical specialties that compare open to MIS.

**Colorectal MIS versus open:**
- 13.4% lower rate of complications\(^7\)
- 53% reduction in blood loss\(^8\)–\(^13\)
- 2.5 days shorter hospital stay on average\(^7\)–\(^11\),\(^15\)–\(^22\)

**Thoracic MIS versus open:**
- 8.5% lower rate of complications\(^23\)
- 60% reduction in blood loss\(^24\)–\(^27\)
- 1.7 days shorter hospital stay on average\(^14\),\(^24\),\(^26\),\(^28\)–\(^35\)

**Gynecologic MIS versus open:**
- 8.4% lower rate of complications\(^36\)–\(^41\)
- 48% reduction in blood loss\(^40\),\(^42\),\(^43\)
- 3.8 days shorter hospital stay on average\(^40\),\(^42\),\(^44\)

**BREAKING DOWN BARRIERS TO EXPAND ACCESS**

The most important question in this conversation is: How do we expand access to the benefits of MIS?

Physicians agree there is one major barrier to adoption — a steep learning curve. But they also agree it’s worth the time it takes to get past this barrier.

> “There is a learning curve, especially given the time commitment to learn the procedures. Yet, it is our duty as physicians to do the best thing for our patients and offer these MIS techniques.”

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Dr. Deborah S. Keller, a colorectal surgeon at Colorectal Surgical Associates in Texas, explains. “There is a learning curve, especially given the time commitment to learn the procedures. Yet, it is our duty as physicians to do the best thing for our patients and offer these MIS techniques.”

The MIS learning curve was examined in a 2017 article published in *Gastroenterology Report*, "Re-appraisal and consideration of minimally invasive surgery in colorectal cancer."\(^45\)

The authors note, “When combined with the steep learning curve and the host of new skills required to perform the surgery ... the initially low rate of 36–55 percent of colectomies being performed laparoscopically in the United States is understandable.”\(^45\)

> “Notwithstanding the aforementioned difficulties,” they conclude, “there seems to be a clear advantage in the laparoscopic approach for treatment of colorectal cancer. Those advantages are of huge significance to the healthcare system, as national health expenditure in the United States has reached $3 trillion and is expected to reach $5 trillion by 2023.”\(^45\)

To adopt MIS, it’s essential to employ training best practices. This is successfully done through a tailored approach that adapts training to learners’ needs.
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Training principles don’t have to be taught through a classroom — and really shouldn’t be. Learners benefit most in a clinical setting, where they can have a hands-on, immersive experience.

MIS training can be complicated — making it vital to share best practices. Training modules that safely and cost-effectively teach skills while simultaneously minimizing learning curves can drive MIS adoption.

A “hub and spoke” model is one such training method, delivering efficiency by developing on-site trainers who then train peers within the hospital system. This model provides scalability for large hospital systems and — more importantly — can easily be adapted for smaller hospitals and geographically isolated rural hospitals, driving MIS access in new locations.

In Rochester, New Hampshire, for example, a laparoscopic colorectal specialist wanted to expand his MIS practice to include hernia surgery. The hospital used a national MIS trainer to help establish a specialized training pathway, creating an institutional ripple effect. Three general surgeons were trained in minimally invasive hernia repair, expanding MIS hernia repair across both the colorectal and general surgical departments and bringing MIS treatment to more local patients.

DRIVING SUSTAINABLE CARE

With steadfast focus on building a sustainable healthcare model, increasing MIS adoption is an essential component to leading that transformative change. Ultimately, as healthcare leaders, it’s in all our interest to drive utilization of MIS. But most importantly, it’s the right thing to do for the millions of patients around the world who will benefit.

REFERENCES

1. Based on internal report, Global SI market model: FY17 procedural mix by approach.


