# Avoiding our mistakes: Arne Wibe, the holy plane, and the retraining of a nation

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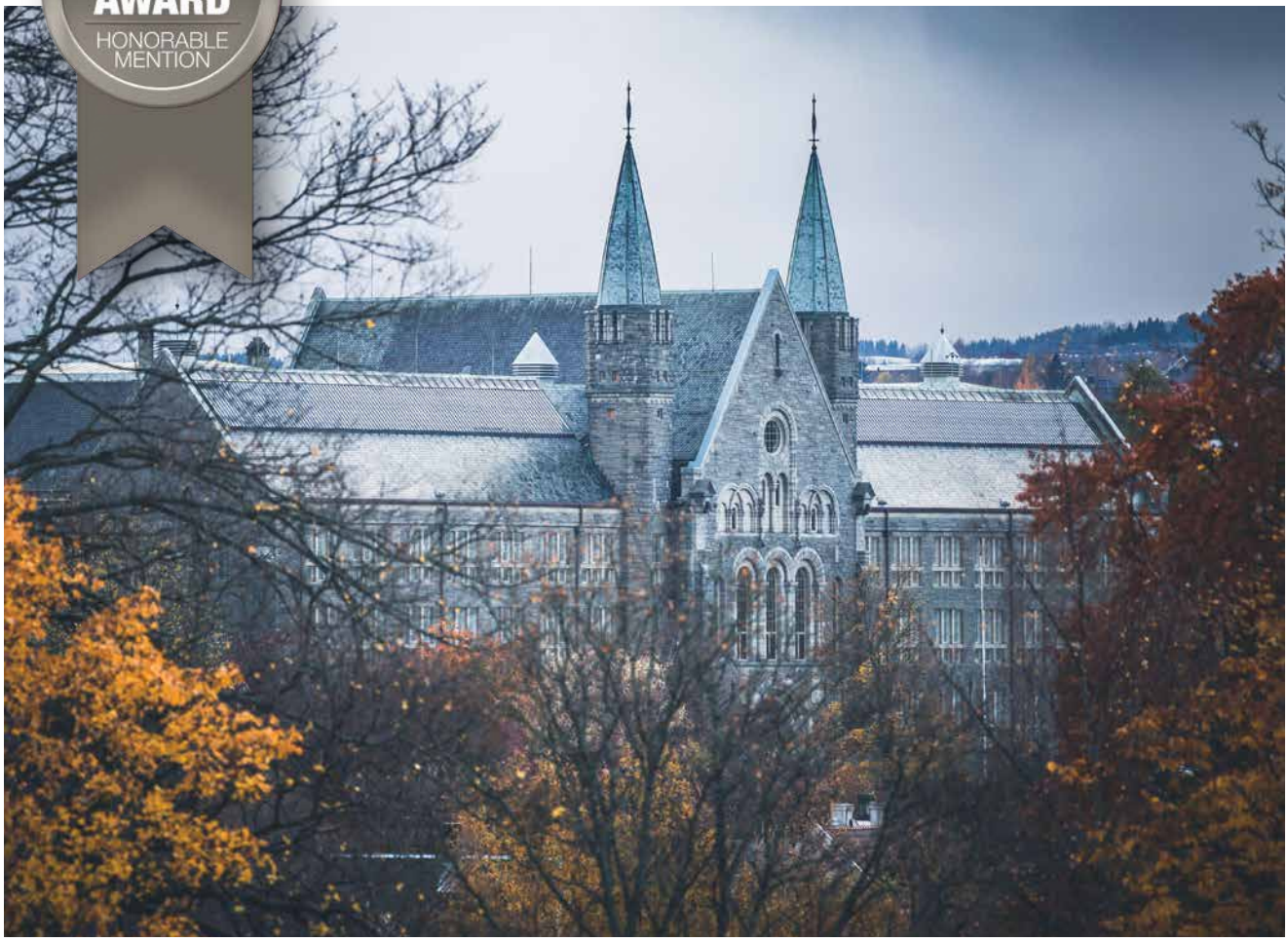

**Trondheim's University of Science and Technology, NTNU Gloshaugen, in Norway.** Adrian Szatewicz, Alamy contributor

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## Prologue

*Corman's Colon and Rectal Surgery* textbook weighs nine pounds and has 1,584 pages. For nearly twenty-five years (the final edition was published in 2013), it was a definitive resource for general surgery residents and colorectal surgery fellows. The origins of this profile, featuring Professor Arne Wibe, MD, PhD, and his work with the Norwegian Rectal Cancer Project, trace back to the following two sentences from page 586 of *Corman's* sixth edition:

> The best example of process of care studies in rectal surgery is the Norwegian Rectal Cancer Project. A 34% local recurrence rate prompted the retraining of colorectal surgeons and the implementation of a standardized total mesorectal excision technique.[1]

In preparation for my colorectal surgery boards, while still a fellow, I was struck by the idea of an entire nation undergoing deliberate retraining. *Can they do that?* I wondered. Subsequent small talk, often while scrubbing next to an attending surgeon before our case began, suggested such a mandate would never happen in the United States. But my curiosity persisted for the next decade: How did the Norwegians do it?

## Beginnings (1954)

Arne Wibe was born in 1954. He grew up on a Norwegian dairy farm, as the third of four children. His father held a master's degree in agriculture and was a respected businessman, serving as a board member for several banks and for the Norwegian Railroad Company. Wibe's mother was equally involved in their community, working part-time as an elementary school teacher and serving on the board of a local hospital.

Arne began working on the farm at age ten. Eight of his ten cousins pursued careers in healthcare: three doctors, three veterinarians, one nurse, and one dentist. Following an older cousin's guidance, Wibe began his university studies planning to become a dentist.

## University (1973)

Only two months after classes began, Arne learned of Dr. Christiaan Barnard and his groundbreaking work in South Africa as a cardiac transplant surgeon. Wibe later recalled, "It was so inspiring…to learn the importance of training in surgery, and how he trained himself into perfection to perform a most complex surgical procedure…"[2] Within 24 hours of learning about Dr. Barnard, Wibe decided to become a surgeon. His university career foreshadowed the approach that would soon distinguish him as surgeon-scientist. "I worked hard…," he remembered. "I liked to understand everything…"[2]

## The Heald TME (1982)

While the colon and rectum are often discussed as a portmanteau, rectal cancer—stage for stage, in comparison to colon cancer—historically had much higher recurrence rates. It was unclear why this difference existed, given the shared embryology, genetics, and environmental exposures of both organs. Seminal work by the English surgeon Dr. Richard Heald provided the answer. The key to understanding rectal cancer's unacceptably high recurrence rates was linked to a surgical technique: the total mesorectal excision (TME).[3]

A thin layer of avascular areolar tissue separates the mesorectal envelope (and the corresponding lymph nodes held within it) from the pelvis. If this delicate envelope remains inviolate throughout surgery, the postoperative recurrence rates remain low; if the mesorectal barrier is perforated, the recurrence rates skyrocket. The data was clear: the surgeon's technique was paramount. Professor Heald dubbed this anatomical layer the "holy plane."

For general surgeons already in practice—especially those performing rectal cancer surgeries such as low anterior and abdominoperineal resections—Heald's discovery was not comforting news. After years of demanding training, there is little a general surgeon fears within the abdomen. But the same cannot be said just caudal to it, within the pelvis: the small, bowl-shaped region fraught with technical challenges in seemingly every direction. And the most treacherous region of all is the merciless posterior plane.

The presacral veins lie deep to the avascular ("holy") plane celebrated by Professor Heald. If penetrated, the

ensuing venous bleeding is horrifying. (To make this point, this complication is often labeled "torrential bleeding" in the surgical literature.[4]) These fragile low-pressure sacral veins are encased by the bony pelvis, leaving the surgeon no safe harbor. Without the ability to apply proximal pressure required to stop the bleeding, a patient can quickly exsanguinate.

To further highlight just how precarious bleeding from the deep pelvis can be, the longstanding best option for controlling this feared complication was to jam the equivalent of a surgical thumbtack into the area and apply as much pressure as possible.[4] A more recent technique is called "muscle-fragment welding," which involves lacing a small piece of the rectus abdominis muscle into the source of bleeding and welding the transplanted muscle segment to a crisp with diathermy (electrocautery) set to the highest possible intensity.[5] These remedies—which remain appropriate answers for surgeons taking their certifying oral board exams—highlight that even the best options for this dreaded complication are essentially a flail.

It is this background that explains the difficulty of persuading general surgeons to become disciples of Heald's "holy plane" dissection. The practice that had long given surgeons comfort—dissecting close to the rectum to avoid dreaded bleeding—was now known to contribute to higher recurrence rates in rectal cancer. What would the world's surgical community do?

## Norwegian Rectal Cancer Project (1993)

A group of Norwegian surgeons from the country's largest hospitals wanted to learn more. They invited Professor Heald to Oslo for a live surgical demonstration on October 31, 1993. His visit marked the genesis of the Norwegian Rectal Cancer Project—the *cause célèbre* that would consume Professor Wibe's professional life for the remainder of his career.

Professor Wibe and his colleagues identified two pillars for the project. The first was the existing Norwegian Cancer Registry. Established in 1951, the cancer registry was a treasure trove of data collected throughout Norway, with reporting required by law. The Norwegian surgeons knew they had outstanding and reliable *a priori* data.

Second, Norway's surgical leaders were committed to leading—rather than merely participating in—the project. The unacceptable recurrence rates appeared to be directly related to a preventable technical issue during surgery; it therefore seemed only logical that surgeons would lead efforts for a solution. The prevailing wisdom held that chemotherapy and radiation therapy were more important than surgery in addressing rectal cancer's stubbornly high recurrence rates. The surgeons of Norway were eager to demonstrate that surgical technique still mattered; and they knew the "holy plane" was the answer. It should be noted that the project's timing was ideal, as no other medical or surgical subspecialty had harnessed Norway's national cancer data for such a focused subgroup analysis. Now the real work could begin.

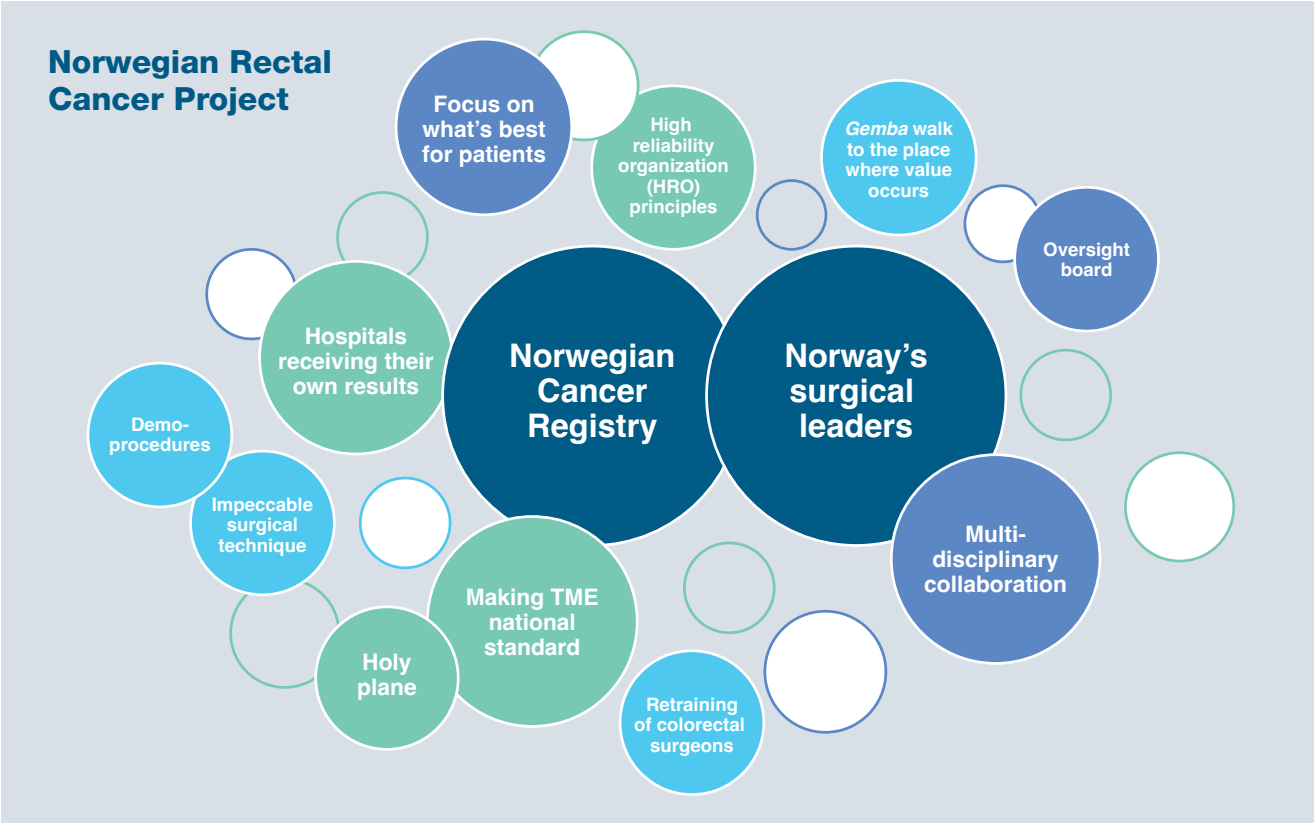
Despite the surgeons' willingness to lead, Wibe understood that multidisciplinary collaboration was critical. Oncologists, pathologists, radiologists, radiation oncologists, and gastroenterologists joined surgeons in diagnosing, treating, and reviewing the data. Another key factor, as Professor Wibe recounts, was that "every hospital, large or tiny, received their own results, and that they could compare their own performance versus other hospitals. That turned out to be the most important to cancer patients in Norway in modern times."[2]

Yet the cornerstone of the project remained impeccable surgical technique. Ensuring the highest technical standard, and, ultimately, retraining those who were not at the requisite level, was an audacious task. The man who would take on this challenge was Arne Wibe. When the project began Wibe was only 39 years old, not yet having completed his subspecialty certification in gastrointestinal surgery.

## HRO (1987 to present)

The first academic paper title referencing high reliability organizations (HRO) was published by Rochlin, LaPorte, and Roberts in 1987.[6] These University of California, Berkeley, political scientists examined how organizations maintained high levels of safety in disparate fields such as nuclear aircraft carriers, air traffic control systems, and nuclear power plants. It would be more than a decade before Weick et al. introduced the language of high reliability organizations into the healthcare setting.[7]

Today, HRO principles are ubiquitous throughout US healthcare systems. Guiding principles such as a "preoccupation with failure" and the "reluctance to simplify" attempt to create a lingua franca—for doctors, nurses, risk managers, and administrators alike—when discussing opportunities for continuous improvement. Beyond




**The Norwegian Rectal Cancer Project shows us all what is possible through the power of collaboration. A unique approach leading to astounding results: Local recurrence, a key marker for any malignancy, decreased from 28% before the project began to 3% over the last 15 years in Norway. Survival rates for non-metastatic disease (stage I–III) increased from 51% to 91% over the same time period.**

the theory of HRO, a commonly discussed best practice involves those in leadership roles visiting a busy unit and asking questions.[8] These rounds (as they are now commonly called) are nothing like how members of the clinical team use the term. Rather, this practice is rooted in the Japanese word *gemba* (loosely translated as "the real place"). The "gemba walk," therefore, is the process of going to the place where the value occurs. This is why leaders visit a bustling floor, asking frontline workers for their feedback.

Although the gemba concept was not yet commonplace in the hospital setting, Professor Wibe and his colleagues did not need political scientists to explain where the value occurred in rectal cancer treatment. As surgeons, they knew the operating room was that "real place." Dr. Wibe was planning to teach the holy plane to an entire country, including every surgical program in Norway. For the next fifteen years Dr. Wibe performed surgery's ultimate gemba walk.

## Retraining (1993–2007)

After three preliminary workshops in Oslo with Professor Heald, the retraining of Norway's surgeons started in earnest. For the next fifteen years, St. Olavs Hospital (Trondheim, Norway) was home to Professor Wibe's retraining efforts. He recalls by email:

> I invited surgeons from different hospitals to assist me during demo-procedures during 15 two-day workshops with about 80 participants each at our university hospital in Trondheim. Here we had the opportunity to transfer the procedure to the auditorium where all the surgeons, MRI-radiologists, oncologists, and pathologists from other hospitals could take part in the discussions, comment and ask questions to the surgical team in the OR.[2]

The workshops were invitation-only; their interdisciplinary nature actually increased their popularity over time. Individual hospital results remained anonymous

for the first ten years of the project. Even so, surgeons would occasionally, often anonymously, reach out to Professor Wibe concerned that their outcomes were not up to his standards.

Their concerns were justified. Over the course of the project, 22 of 55 hospitals stopped performing rectal cancer surgery. In the late 1990s, the board overseeing the project decided that only subspecialists in colorectal surgery would be allowed to perform rectal cancer surgery in Norway. It was undoubtedly hard for Professor Wibe to be the face of a retraining initiative that closed 40 percent of the rectal cancer surgery programs in Norway.

Concurrently, the subspecialty of colorectal surgery was still maturing worldwide. In the 1990s, general surgeons in Norway completed six years of postgraduate training and approximately 1,000 surgical cases. Gastrointestinal surgical subspecialists at that time—now referred to as colorectal surgeons worldwide—were required to complete an additional three years of surgical training. But at the start of the project, the pipeline for gastrointestinal trainees was relatively small, and the need for rectal cancer surgeries could not wait for future trainees to complete their fellowships. Professor Wibe therefore served as both teacher and gatekeeper of the total mesorectal excision technique. His efforts were worth it: the results of the Norwegian Rectal Cancer Project went public. And they were breathtaking.

> *Dr. Wibe and his colleagues decided to do something that had never been done before. The result was a redefinition of what is possible for surgical quality at an international level.*

## Results (2010–2025)

Local recurrence, a key marker for any malignancy, decreased from 28 percent before the project began to three percent over the last 15 years in Norway. Survival rates for non-metastatic disease (stage I–III) increased from 51 percent to 91 percet over the same time period. When explaining such tremendous results, Dr. Wibe emphasizes the importance of the project's board membership, specifically having "professors from the five university hospitals, each of them represented the colleagues in their own region… we had two board members from local hospitals. Thus, this national initiative was rooted all over the country."[9] True to the principles now espoused by high reliability experts, the project had support from those actually doing the work. Rather than a top-down approach, "the initiative for the project… [came] from active colorectal surgeons… our work took the responsibility away from the authorities, we got the full overview of the national results and could document progress every year…".[9]

The process of data collection and reporting evolved with the project. Professor Wibe explains:

> During the first seven years, all hospitals received their own results, and regional and national means in [order] to understand their own quality. However, under-performing hospitals got detailed data on what might be the cause of their results, so that they were able to change practice and improve. During the last 25 years, all results from every hospital have been published publicly in a yearly comprehensive report.[2]

Dr. Arne Wibe filled a unique role—or perhaps created the role—for surgical quality implementation in Norway. While Britain's Professor Heald was receiving international praise for his brilliant TME discovery, Professor Wibe was methodically retraining Norwegian surgeons to ensure the "Heald TME" technique became the Norwegian national standard.

It is notable that Great Britain, where Dr. Heald was appointed an Officer of the Order of the British Empire (OBE) among myriad awards, was not able to match Norway in standardizing their surgical training efforts. Similarly, the United States, with the well-established American Board of Colon and Rectal Surgery (of which the author is a diplomate), was not able to hold American's surgical community to this evidence-based standard nationwide. (Of note, the United States still does not require fellowship training for rectal cancer surgery.)

It can be argued that the most inspiring aspect of the holy plane's impact on cancer care was not the discovery—which was impressive—but the surgical retraining of a nation, which was unprecedented. In his unassuming way, Dr. Wibe redefined what is possible in high-reliability surgical care. He collaborated with his colleagues, both within and across specialties, to do something that the world had never seen before.

## Looking back (2025)

Dr. Wibe is now 71 years old and an emeritus professor at the Norwegian University of Science and Technology. At the time of this writing, he is a visiting professor at three universities in the United States and serves as a scientific advisor to five European nations.

He was only 28 years old when Dr. Heald and his British colleagues published their groundbreaking TME paper. It would be another nine years before he would obtain the "Specialist in General Surgery" certification, Europe's equivalent of general surgery board certification. When the Norwegian Rectal Cancer Registry began in 1993, Dr. Wibe dared to teach his entire country how to perform a technically demanding new technique.

Early in the project, Professor Wibe undoubtedly trained surgeons with more experience—both in the operating room and in life—to perform the delicate total mesorectal excision. I asked Professor Wibe if there was opposition to the mandatory retraining. His response focused on what was good for the patients rather than the egos of the surgeons impacted. He did not evade my questions about the impact to the surgeons he retrained, but rather seemed unable to comprehend surgeons' unwillingness to accept what is best for their patients. He stated, "There was no opposition for retraining, as the results at St. Olavs and some few other hospitals spoke for themselves."[2]

The former university student, so inspired by Dr. Barnard years ago, now serves as inspiration to colleagues worldwide. Rather than individual accolades, the ultimate recognition of the project is the implementation of similar cancer initiatives worldwide. Sweden, in particular, implemented a similar process and generated similarly spectacular results. Professor Wibe explains:

> What was really inspiring, was some collaboration in 2016 with our Swedish colleague, Professor Glimelius, for one paper on more than [20,000] patients… In 2009 the [local recurrence rates were] similar in the two countries…[9]

Professor Wibe pushed the entire field of colorectal surgery forward. The standards expected of Norway's rectal cancer surgeons—nationwide—were non-negotiable. The data collected were transparently shared: every hospital, every year. Professor Wibe and colleagues remained focused on what was best for their patients.

Today, he considers the greatest artifact of the project the continually updated reference document. This tome—with over 700 references and counting—is a gift to surgeons worldwide. The Norwegian Rectal Cancer Project shows us all what is possible through the power of collaboration.

## Looking forward (2026 and beyond)

In our email exchanges, Dr. Wibe made it clear that the success of the project was the teamwork itself.[2, 9] No surgeon, institution, or specialty could reasonably be expected to take on this task. Yet this is exactly what Wibe and colleagues did.[10, 11]

It wasn't a Norwegian surgeon who had the brilliant discovery of the "holy plane." And most of the world remained content to let surgeons decide for themselves if they would adjust their operative technique based on Dr. Heald's findings. But Norway took a different approach. Rather than wait and see, the surgical leaders of Norway—Professor Wibe most of all—decided to take action. The stakes were too high; the data were too compelling; the benefits to patients were too great. Dr. Wibe and his colleagues decided to do something that had never been done before. The result was a redefinition of what is possible for surgical quality at an international level.

## Epilogue

I asked Dr. Wibe if he had any comments for you, the readers of *The Pharos* and the Alpha Omega Alpha community. His response shows what drove him all these years.

> The patients are in our hands, and they can do nothing to avoid our mistakes, so we have only one chance. There is always some development, and we have to keep updated, to use our competence and our skills. We have to perform![2]

> Knowing is not enough; we must apply. Willing is not enough; we must do.
>
> —Goethe (1749–1832)

**Acknowledgements**

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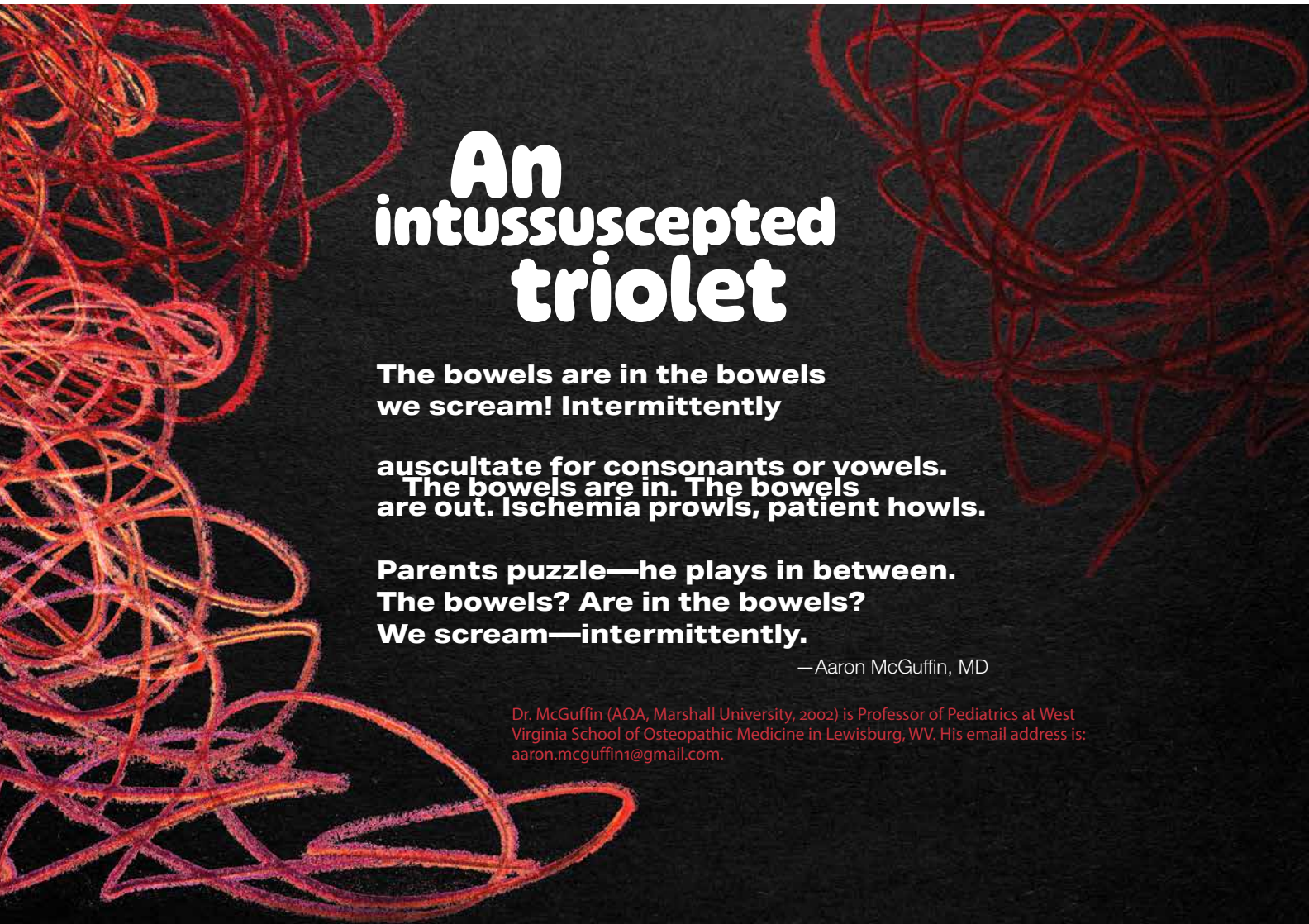

# An intussuscepted triolet

**The bowels are in the bowels**
**we scream! Intermittently**

**auscultate for consonants or vowels.**
**The bowels are in. The bowels**
**are out. Ischemia prowls, patient howls.**

**Parents puzzle—he plays in between.**
**The bowels? Are in the bowels?**
**We scream—intermittently.**

—Aaron McGuffin, MD

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