Quality in Obesity Treatment

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Preface

No disease has had more impact or notoriety than obesity in the past decade. The breath of influence of obesity is legion, affecting all fields of medicine and society in general. Obesity increases the cost of care and diminishes the effectiveness of treatment throughout the house of medicine. From cancer to heart disease to diabetes, obesity holds great sway. Obesity management is at a unique time and place with an entire continuum of care now available from counseling to medications to endoscopic therapy to surgery. The field of quality in obesity treatment is emerging and has a strong legacy through bariatric surgery, which has established a high-quality practice of care. Extending and embedding this quality of care are critical for the empathetic and effective care of patient with obesity.

Quality must be bedrock for obesity treatment for many reasons. First, our patients in need deserve it. Patients with obesity are kept from treatment for too long either through personal, professional, or societal bias. The time to treat is now. Second, obesity treatment is often viewed as personal responsibility, and unfortunately, patients will avail themselves to treatment that is without evidence or care. Third, with over one-third of the US population being overweight and obese, there is concern for cost. We can address both cost and quality through a value proposition that incorporates a societal perspective.

This textbook is a unique, comprehensive, contemporary review of this field and will serve as a valuable resource for policy-makers, insurance administrators, primary care physicians, obesity medicine specialists, bariatric surgeons, and any medical specialty interested in obesity quality management with likely candidates coming from gastroenterology, endocrinology, cardiology, sleep medicine, and orthopedics.

The book reviews quality definition, measurement, and accountability for obesity management. National and local efforts to improve quality and value will be demonstrated. The interplay between quality, cost, access, and satisfaction will be fully depicted with a goal towards not only fulfilling current standards but also anticipating future needs. A thorough inventory of current best practices in all aspects of obesity care is catalogued with a gap analysis employed for potential areas of improvement. Collaborative and multidisciplinary practices will demonstrate the most contemporary experience. Much like other great fields of medicine such as cancer or heart disease, surgery has gained early acceptance and effectiveness for treatment and has acted as a lead point for obesity treatment. The lessons learned for bariatric surgery will

be reviewed with a perspective of how to embed and expand these lessons to the entire continuum of care. It is inspiring to note that the bariatric surgery accreditation program (MBSAQIP) now has endoscopic and medical weight loss standards and qualifications in addition to primary surgical mission.

This textbook will serve as a very useful resource for physicians, payors, and researchers dealing with, and interested in, this challenging disease. All chapters have been written by experts in their fields and include the most up-to-date scientific and clinical information. The chapter format of short length with take-home messages and questions and answers will present a practical approach about how to build quality in obesity treatment.

While our task of diminishing the burden of obesity is great, our opportunities are equally vast. We are present at the creation of a new paradigm of multidisciplinary care that is evidence-based, patient-centered, and outcome-driven. Bariatric surgery is safe, effective, and enduring, and we now have over a dozen new medications and devices to combat obesity in a similar value-driven manner. What is now required is coordination and access to care.

While most of the emphasis are on treatment, true results will be achieved with prevention. Of note, obesity is a family disease. If one family member is treated, then the entire family is also treated because we eat, sleep, and exercise together. Treating one patient may start a ripple that will flow through a family, raise the tide in a community, and cascade throughout society to decrease the burden of obesity. It is my hope, belief, and desire that this book will keep the ripple flowing.

New Haven, CT, USA John M. Morton

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Part I

National Definitions, Goals, Initiatives

Defining and Measuring Quality

1

Matthew M. Hutter

Key Take-Home Points

- Measuring quality is important to drive continuous quality improvement, as well for informed decision-making and defining value.
- Defining quality is complex, but the Institute of Medicine's six aims for improvement best describe quality as being safe, effective, patient centered, timely, efficient, and equitable.
- The Donabedian framework is useful for determining what to measure: structure, process, or outcomes.
- Outcomes = patient factors + treatment effectiveness + quality of care + random chance. So, if you measure outcomes with risk-adjusted, benchmarked, clinically rich data with appropriate statistical analyses, you can measure the quality of care provided.
- MBSAQIP accredited programs collect high-quality data on 100% of their bariatric cases.
- Surgeons should be leaders in measuring quality if we are to have meaningful metrics.

Why Measure Quality?

Our patients' major concern when they decide to have surgery, and when they are choosing their provider, is determining how they can receive the highest quality of care. As surgeons, we have dedicated our lives to providing the highest quality of care to our patients. Defining and measuring quality is critical for what we and our patients desire most. The quote "If you cannot measure it, you cannot improve it" which has been attributed to Lord Kelvin, the first scientist elevated to the House of Lords in England, and associated with W. Edwards Deming, the legendary business management guru, highlights the need for meaningful quality metrics to inform change. So why measure quality? The primary reason is to drive continuous quality improvement so we can provide the high quality of care we and our patients want.

Measuring quality has become quite complex; however the principal concept is quite simple. Dr. Ernest Amory Codman – the founder of surgical outcomes research and quality improvement or "the end results system" as he called it – said at the turn of the nineteenth century that it is "nearly the common sense notion that every hospital should follow every patient it treats long enough to determine whether or not the treatment has been successful and then to inquire "if not, why not?" [1]. Today, over 100 years later, we are

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still working on measuring quality to answer this simple but critical question – "if not, why not?"

Even though the first and foremost reason to measure quality is to drive continuous quality improvement, measuring quality is important for many additional reasons. Accurate quality metrics are important for informed decision-making, not only by the surgeon as to which operation is right for which patient but the patient who is becoming an increasingly more educated consumer. Today, the buzzword in healthcare is "Value" as we move away from fee for service towards value-based care [2]. Value = Quality ÷ Cost, and so if we don't measure quality accurately, with meaningful and discriminatory metrics, then value will simply be related to cost. If we or the administrators of healthcare systems are to focus just on costs without meaningful metrics for quality, our patients are likely to suffer.

For metabolic and bariatric surgery, measuring quality is even more critical due to the misperceptions that obesity is a lifestyle choice, that patients with obesity have only themselves to blame, and that the treatments we offer are not proven and are dangerous. In 2004 and 2005, after a rapid increase in the number of bariatric operations performed in the United States at the time of adoption of the laparoscopic approach, and due to media attention of published reports of mortality rates in high-risk patients of 2–3%, the Center for Medicaid and Medicare services proposed that metabolic and bariatric surgery should **NOT** be a covered benefit [3]. Since policy that is created by CMS is usually followed by other payers and insurers, this noncoverage proposal, should it have been followed, could have been the end of metabolic and bariatric surgery in the United States. However, following comments from concerned patients and their surgeons, this noncoverage proposal was overturned, and the National Coverage Determination for bariatric surgery in February 2006 stated that bariatrics surgery would be reimbursed but only if performed in accredited centers or "Centers of Excellence" which undergo a rigorous process of verification according to specific standards and ongoing measurement of the quality of care provided through a robust data collection program [4]. These ongoing misperceptions about obesity and the surgical treatment of obesity are highlighted by the fact that CMS convened a Medicare Evidence Development & Coverage Advisory Committee (MEDCAC) meeting on bariatric surgery as recently as August 2017, where again the policymakers called into question the care that we provide.

In this chapter, we will define what is quality, how to measure quality, how to measure quality in metabolic and bariatric surgery, and the surgeons role in quality measurement and quality improvement.

What Is Quality?

Defining quality is complex, because there are so many domains to consider as to what constitutes high-quality care. The Institute of Medicine puts forward the following framework in there landmark publication in 2001 *Crossing the Quality Chasm* [5]. The six aims for improvement for healthcare systems are [6]:

1. *Safe* – Avoiding harm to patients from the care that is intended to help them.
2. *Effective* –Providing services based on scientific knowledge to all who could benefit and refraining from providing services to those not likely to benefit.
3. *Patient centered* – Providing care that is respectful of and responsive to individual patient preferences, needs, and values in ensuring that patient values guide all clinical decisions.
4. *Timely* – Reducing waits and sometimes harmful delays for both those who receive and those who give care.
5. *Efficient* – Avoiding waste, including waste of equipment, supplies, ideas, and energy.
6. *Equitable* – Providing care that does not vary in quality because of personal characteristics such as gender, ethnicity, geographic location, and social economic status [6].

Currently, data collection in metabolic and bariatric surgery is one of the most robust systems of all of surgery and the surgery specialties; however even our programs do not assess all these six factors. There is work to be done, and these are helpful facets of quality that we can aim for.

How Do You Measure Quality?

A helpful framework on how to assess quality was developed by Avedis Donabedian in 1966 which categorizes measures as related to structure, process, and outcomes [7, 8]. Structural measures include things like procedure volume, use of computerized position order entry, nurse/bed ratios, and "closed" ICUs. Process measures describe specifics types of care provided such as the use of clippers rather than razors, administration of antibiotics and their timing, active warming blankets, Foley catheters, or the use of drains. To spur improvement and to minimize unintended consequences, appropriate process measures should lead to improved outcomes. Outcomes reflect the actual effect that the care has on a patient and include complication and mortality rates, as well as other metrics such as patient-reported outcomes, patient experience, functional status, quality of life, and costs.

In order to measure quality, it is critical to have high-quality data. High-quality data is prospective, risk-adjusted, based on standardized definitions, collected by audited train data collectors who are not involved in direct patient care, benchmarked, and analyzed with sound statistics and reported with responsible conclusions. "Garbage in, garbage out" is a phrase used in quality assessment, and one needs to be weary of using administrative data which was developed and collected to optimize billing, rather than to specifically assess the clinical care provided. Administrative data can be quite helpful to assess objective events like readmissions, or returns to the operating room, but frequently lack the critical details needed for risk adjustment, about the preexisting conditions or state of the patient, or whether events were related or unrelated to the metabolic and bariatric operation itself.

Outcomes or "the end results" are the ultimate metric as it measures how the patients are actually impacted. For surgical care as compared to medical care, measuring outcomes are much more achievable because we have a defined event (an operation) and we can measure a significant change between the preoperative and postoperative status. Measurement of outcomes can provide a meaningful measurement of the quality of care. Outcomes = patient factors + treatment effectiveness + quality of care + random chance. Patient factors can be accounted for by risk adjustment, treatment effectiveness can be assessed by benchmarking, and random chance can be assessed by statistical analyses. So, if you measure outcomes with risk adjusted, benchmarked, clinically rich data with appropriate statistical analyses, you can measure the quality of care provided.

Careful consideration has to be undertaken as to which outcomes are most appropriate to measure for which operations. These authors have provided a very helpful framework to consider when considering which outcomes to assess for which operations, as shown in Fig. 1.1 [9]. High caseloads per hospital are shown on the Y-axis, and high baseline risk from the procedure is shown on the X-axis. For procedures with high caseload per hospital and high baseline risks, such as CABG or cardiac valves, outcome measures such as mortality or complication rates are appropriate to measure. For operations with high baseline risks but low caseloads per hospital, such as esophagectomy, structural measures like volume are most appropriate to measure. For operations with high caseload for hospital, but low baseline risk, then process measures or patient-centered outcomes should be measured. Operations with low baseline risk and low caseloads per hospital might not be the initial focus for your QI efforts. Metabolic and bariatric surgery has become so safe, and caseloads per hospital are relatively high, which means that metabolic and bariatric surgery can be placed in the upper left quadrant on the graph where process measures and patient centered outcomes should be the focus.

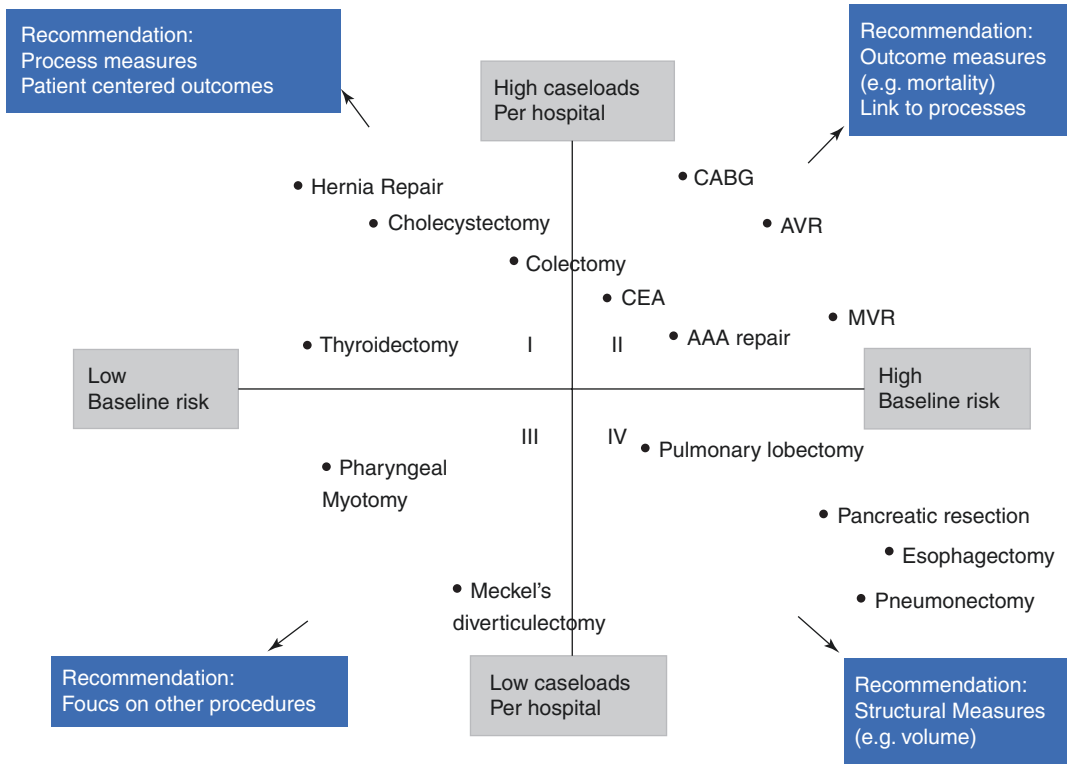

Fig. 1.1 Recommendations for when to focus on structure, process, or outcomes. (Adapted from Birkmeyer et al. [9]. With permission from Elsevier)

Measuring Quality in Metabolic and Bariatric Surgery

As detailed throughout this book, metabolic and bariatric surgery has a long history of measuring quality. Some of the operations we have performed in the past are now obsolete and for good reasons. New operations continue to evolve and need to be studied to understand their strengths and weaknesses. Therefore ongoing data collection is critical, with continuously updated metrics that capture new and novel technologies. A burning platform is a compelling way for people to move their feet and change what they have been doing. Change is hard. Developing the infrastructure to collect data and the ongoing expense to do so is costly. In metabolic and bariatric surgery, our burning platform or catalyst for change was the noncoverage proposal and ensuing National Coverage Determination by CMS requiring accreditation. At the time of this intense scrutiny in the mid-2000s, the American College of Surgeons developed a data collection program for the Bariatric Surgery Center Network accreditation program, and the ASMBS, in association with the Surgical Review Corporation, developed the Bariatric Outcomes Longitudinal Database as a part of their Centers of Excellence program. In March 2012, these two programs joined into one program becoming the Metabolic and Bariatric Surgery Accreditation and Quality Improvement Program (MBSAQIP), which is a joint venture of the ACS and ASMBS [10]. Measuring and improving the quality of care is the foundation of this program. At accredited centers, data collection is required for 100% of cases metabolic and bariatric operations performed. Data include bariatric specific data points for leaks, strictures, internal hernias, and other outcomes. The data is collected by audited trained data collectors who

are not directly involved in patient care. The data collected includes 30-day morbidity and mortality but also includes impact on weight and weight-related illnesses including diabetes, hypertension, hypercholesterolemia, gastroesophageal reflux disease, and obstructive sleep apnea. Data is collected at 30 days, 6 months, 1 year, and annually thereafter. Univariate analyses are continuously updated and available online, including morbidity and mortality reports, as well as reduction in BMI, and reduction in comorbidities overtime. Individual surgeon outcomes can be compared to center outcomes, which are compared to nationally benchmarked outcomes. Risk-adjusted reports, which incorporate state-of-the-art statistical analyses including hierarchical Bayesian models with adjustment for shrinkage, are reported semiannually. Approximately 95% of all bariatric procedures performed in the United States have their data reported through this program. Data are used to drive continuous quality improvement and to assess the quality of care provided as sites go through the accreditation process.

Surgeons Should Lead in Measuring Quality

As you can see from the above, measuring quality is complex but critical. So who should be measuring quality? Surgeons are the ones who need to define quality. We are the ones who care for the patient through all phases of care – preoperative, intraoperative, postoperative, and ongoing follow-up. We have been the one who have been the stewards of the most effective treatment of this disease, and we need to continue to do so. We need to listen to our patients to identify the most meaningful metrics for our patients. We need to determine the data points and data definitions. We need to determine what outcome measures should be measured or process measures should be followed. We need to capture data on new and novel techniques and technologies so we can advocate for and improve on the good ones and identify the bad ones in a timely fashion to minimize harm. We need to insist on good data and not claims data. We need to work with statisticians to determine how to appropriately risk adjust. We need to determine what determines an outlier. We need to create discriminatory metrics because a performance metric where everyone gets an A+ is not a performance metric. We need to be proactive in these discussions rather than reactive, as patients, payers, policymakers, and the public want this information now. If we don't define quality, then others will do so and will do so badly, and we and our patients will be stuck with the unfortunate consequences.

Questions

1. What six aims the Institute of Medicine focuses on for improvement in quality?
   Safe, effective, patient centered, timely, efficient, and equitable.
2. What is the name of the data collection and accreditation program for Metabolic and Bariatric Surgery that captures over 95% of all procedures done in the USA?
   The MBSAQIP – the Metabolic and Bariatric Surgery Accreditation and Quality Improvement Program.
3. Who should be leading the efforts to define and measure quality in metabolic and bariatric surgery?
   The surgeons.

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2 Building a Metabolic and Bariatric Surgery Data Registry: Quality Improvement Through Measurement

Teresa Fraker

Key Take-Home Points

- The four guiding principles of Continuous Quality Improvement include setting the standards, building the right infrastructure, collecting robust data, and verification through a third party.
- Prospectively collected, clinically derived data is essential for metabolic and bariatric surgery programs to measure their quality improvement efforts.
- The principal benefit of the MBSAQIP data registry is to provide a statistically relevant risk-adjusted analysis so programs can measure their performance against their peers.
- Measurement of data against peer groups supports patient outcomes by decreasing variability in care, increasing efficiency of care, and decreasing complications.

Introduction

This chapter reviews the history and timeline of data registry development for metabolic and bariatric surgical care and further describes the impact that data utilization serves to inform quality improvement efforts at both the local and national level.

History and Timeline of Quality Improvement

No examination of the use of data for surgical quality improvement efforts is complete without highlighting the efforts of Ernest Amory Codman, MD, FACS, who was considered the pioneer of outcomes-based quality improvement or the concept of the "end result idea" [1]. Over the trajectory of his career, Dr. Codman devised a system whereby he would follow patients longitudinally over a course of many years after their surgical treatment. He would diligently record the patient's outcomes in an effort to document the efficacy of the surgical intervention or the "end result" of their care. These principal concepts are enduring today, as a testament to his work well beyond his death in 1940. It is interesting to note that these same core concepts influenced the founding of the American College of Surgeons (ACS) in 1917, which would eventually transform into the hospital standardization movement,

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a forerunner to what is recognized today as The Joint Commission, or TJC [2].

Another pioneer, Avedis Donabedian, described in 1966 a framework for defining and assessing quality of healthcare services. He identified three basic components essential to quality of care which included structure, process, and outcome. He emphasized that the proper integration of these three is essential to improvement of quality of care [3].

The History of Surgical Innovation in Metabolic and Bariatric Surgery

Often considered the founder of bariatric surgery, Edward Mason, MD, FACS, performed the first gastric bypass in 1966, which connected a loop of jejunum to the gastric pouch [4]. Approximately 11 years later, this approach was modified to what we now know as the Roux-en-Y gastric bypass [5]. Dr. Mason further introduced the vertical-banded gastroplasty, but in modern bariatric surgery practices, this technique is all but obsolete. More contemporary techniques such as the laparoscopic Roux-en-Y gastric bypass and the laparoscopic sleeve gastrectomy have continued to evolve, with the laparoscopic sleeve gastrectomy serving as the most prevalent bariatric surgery performed in those centers based in the United States. During the calendar year of 2016 (operative dates of January 2016–December 2016), there were 40,000 laparoscopic Roux-en-Y gastric bypass surgeries performed versus 107,000 laparoscopic sleeve gastrectomies performed in nearly 800 Metabolic and Bariatric Surgery Accreditation and Quality Improvement Program (MBSAQIP)-accredited centers [6].

In addition to surgical innovation, Dr. Mason was a significant contributor in the development of the National Bariatric Surgery Registry in 1986. This data was integral and provided the first evidence that bariatric surgery could be performed safely with a low mortality rate [7].

As the penetrance and popularity of metabolic and bariatric surgery grew and overall volumes of surgical procedures were expanding, it became evident that general surgeons were often inadequately trained in bariatric surgery techniques after attending brief and minimal introductory courses [8, 9]. Metabolic and bariatric surgery was largely performed absent the appropriate infrastructure which was necessary to provide not only a safe and efficacious perioperative patient experience, but the pre and postoperative management of patients was additionally felt to be substandard. As a resulting consequence, untoward clinical complications occurred coupled with concerning in-hospital mortality rates which were as high as 0.8% in 1998 [10, 11]. In parallel, there was significant adverse press associated with these procedures, creating public distrust of metabolic and bariatric surgery as a viable intervention for the long-term management of morbid obesity and its associated illnesses. The continued scrutiny from the public led to many insurers ceasing coverage for metabolic and bariatric surgery as it was thought to be potentially dangerous and cost-prohibitive.

The Journey Toward Bariatric Surgery Accreditation

As the future and viability of metabolic and bariatric surgery was felt to be in jeopardy, it was imperative that immediate intervention was necessary to preserve the integrity and reputation of the profession. Scrutiny of the care provided by surgeons was crucial if these surgical options were to endure and be accepted as a viable treatment option for patients with obesity.

In an effort to address this, the American Society for Metabolic and Bariatric Surgery (ASMBS) and the American College of Surgeons (ACS) established separate but similar accreditation programs to improve the quality of metabolic and bariatric surgery care.

The ASMBS Bariatric Surgery Center of Excellence (BSCOE) was developed in 2004 to provide a mechanism which would identify programs providing high-quality metabolic and bariatric surgery care. These standards included comprehensive and standardized surgical care, provisions for long-term follow-up of patients, and the presence of a multidisciplinary team to

support the unique needs of the bariatric surgery patient. The BSCOE program was administered by the Surgical Review Corporation (SRC). In 2005, through a similar and parallel effort, the ACS created the Bariatric Surgery Center Network (BSCN) [12].

Both the BSCOE and BSCN programs created standards which sought to provide guidelines for metabolic and bariatric surgery programs to develop the support they needed for the infrastructure and processes to improve clinical outcomes which were under scrutiny. A core component of these standards was a multidisciplinary team with appropriate education and training necessary to provide efficacious and safe care for the unique needs of the morbidly obese patient. Data points were collected by the two respective accreditation programs' registries whereby outcomes were compiled as well. In 2011, both programs' data registries had greater than 100,000 surgical procedures per year being entered.

Limitations of the Original Metabolic and Bariatric Surgery Accreditation Programs

There were several limitations with the BSCOE and BSCN in that programs were accredited based solely on structural and process-based components. Additionally, surgical volumes were measured but not correlated to patient outcomes. These were limiting factors in that both programs struggled to identify which programs were "excellent" versus which ones were not. Additionally, dual (and essentially competing) accreditation options caused degrees of confusion for programs in that the standards were similar yet different. Lastly, the Centers for Medicare and Medicaid Services (CMS) and some insurance companies required one of the two designations to be in place in order for programs to provide metabolic and bariatric surgical care to its beneficiaries, which was particularly challenging for some programs in rural locales based on the minimum volume requirement of 125 surgeries per year.

An examination of accredited metabolic and bariatric surgery COEs appeared to have directly contributed to improve patient outcomes as data from the Nationwide Inpatient Sample revealed inpatient mortality associated with metabolic and bariatric surgery dramatically improved from 0.8% in 1998 to 0.21% in 2003 and would decrease even further to 0.1% in 2008 [13, 14].

This was encouraging in the quality and safety arena; however, studies looking at CMS policy limiting metabolic and bariatric surgery coverage only to hospitals designated as COEs found no difference in adjusted rates of complications and reoperations, as well costs savings, in the time before and after the national coverage decision in one analysis [15–17]. This analysis eventually led to a systematic review of 1.5 million patients and 13 studies that clearly demonstrated the value of bariatric surgery hospital accreditation, a view enforced by an accreditation requirement from all four major private insurers (Blue Cross, United, Cigna, Aetna) [18].

To allow for maturation of the metabolic and bariatric surgery accreditation process, new evidence was emerging regarding the volume requirement embedded within the previous accreditation program standards. Growing evidence supported reducing the annual volume criteria from 125 total procedures to 50 stapling cases, which sought to strike a balance of maintaining quality without restricting access to care for patients with obesity [19].

The New Era in Metabolic and Bariatric Surgery Quality Improvement: The Metabolic and Bariatric Surgery Accreditation and Quality Improvement Program (MBSAQIP)

Fast forward to 2012, the ACS and ASMBS announced that they planned to combine their respective national metabolic and bariatric surgery accreditation programs into a single unified national accreditation program for metabolic and bariatric surgery programs. This program was named the Metabolic and Bariatric Surgery

Accreditation and Quality Improvement Program (MBSAQIP), which represents a unique collaboration between the ACS and ASMBS. Following a prescribed set of standards, a metabolic and bariatric surgery program can achieve accreditation after following a rigorous application and on-site verification process to demonstrate that it is able to meet and maintain specific requirements. MBSAQIP provides a platform for continuous monitoring of outcomes and resource utilization while emphasizing Continuous Quality Improvement. Currently, there are approximately 800 MBSAQIP-accredited programs in the United States [20]. The principles of MBSAQIP largely center on the ACS' four guiding principles of Continuous Quality Improvement, which include setting the standards, building the right infrastructure, collecting robust data, and verification through a third party (Fig. 2.1).

Although all four of these principles are essential in building a thorough accreditation program, the robust data collection process which is a standard in the MBSAQIP (*Standard 6, Data Surveillence and Systems*) is what sets it apart from other registries [21].

Managing data is a critical component of optimizing performance within metabolic and bariatric surgery programs. As per the guidance of MBSAQIP Standard 2.7, the Metabolic and Bariatric Surgery Clinical Reviewer (MBSCR) is the foundation of the data collection process. Each accredited center is required to designate an MBSCR who is accountable for gathering data prospectively directly from the medical record. Their primary role post-abstraction is to prepare the data for aggregation and analysis for the Metabolic and Bariatric Surgery (MBS) Director (Standard 2.5) as well as the Metabolic and Bariatric Surgery (MBS) Committee (Standard 2.4).

Fig. 2.1 The four guiding principles of Continuous Quality Improvement. (With permission from American College of Surgeons)

To maintain data integrity and to eliminate any potential bias, the designated MBSCR is not allowed to contribute to direct patient care while abstracting data into the MBSAQIP data registry. All MBSCRs follow uniform definitions which support the variables they abstract in an effort to ensure standardized data abstraction practices. For example, all MBSCRs follow a uniform definition of hypertension, which is a preoperative variable that is collected. Additionally, all MBSCRs are on-boarded and trained via online educational modules, and they are not allowed access to their program's data registry until they have passed the modules satisfactorily at a minimum of 90%. Once in the role of the MBSCR for a minimum of 6 months, they must sit for an annual certification examination with a minimum of a 90% pass rate, or their data registry access will be removed. Lastly, data integrity audits conducted by nurses expertly trained in the variables and definitions are ongoing throughout each year on a randomized basis to ensure that the over 1000 MBSCRs are abstracting data in conjunction with the definitions as supported by the data registry.

MBSAQIP programs are afforded the capability of comparing their individual program's data to all programs entering data into the MBSAQIP data registry. This is essential for benchmarking their local performance versus those of their peers. This data must be critically analyzed among all surgeons at the center as well as the hospital or ambulatory surgery center that supports the accredited program. An ideal forum for which to review this data is the MBS Committee, which seeks to serve as the primary forum for Continuous Quality Improvement. During the MBS Committee meetings, clinical or operational decisions can be prioritized to support quality and safety efforts for the metabolic and bariatric surgery patient care at the local level. The collegiality which develops as a result of these discussions can be extremely helpful in reducing practice variation and provide helpful standardization of processes and protocols where necessary, and it additionally provides a forum to reduce variability in the delivery of clinical care among the multidisciplinary team.

The single most valuable component of the data collection process is the MBSAQIP Semiannual Report (SAR) [6]. The SAR is provided to participating MBSAQIP programs twice annually in order for the center to measure their outcomes against an aggregate data set of over 150,000 principal operative procedures of laparoscopic Roux-en-Y gastric bypass and laparoscopic sleeve gastrectomy procedures. Each SAR is prepared using sophisticated modeling by expertly trained biostatisticians. While risk adjustment involves complicated statistical methods, its goal for MBSAQIP is clear: to correct for differences in patient and procedure mix so that programs can be fairly compared. An effective risk adjustment process based on logistic and hierarchical modeling allows programs to be equally compared, particularly if there are differences in patient comorbidities or differences in the complexity of (or risks associated with) procedures performed. MBSAQIP statisticians adjust for procedure mix by dividing procedure types into separate models. Because MBSAQIP employs a large number of clinically relevant and accurately recorded risk adjustment variables using accepted statistical methods, it would seem that risk adjustment is effective and useful, particularly at reducing surgeons' anxieties that their patients are "sicker" or "more complicated" than their peers.

Conclusion

Accurate data collection, review, and feedback are essential in order to develop a high-quality metabolic and bariatric surgery program. Critical analysis and interpretation of data assist programs to provide valuable benchmarking of their performance against their peers in an effort to identify opportunities for improvement in the provision of patient care at the local level.

A highly successful metabolic and bariatric surgery program embraces a patient safety-centered culture, effective leadership, and a clinically rich data registry for which to support these efforts.

Standardization of care is the basis of quality improvement. Participating in an accreditation and data collection program provides the foundation necessary to ensure all metabolic and bariatric surgery programs achieve optimal outcomes for their patients. All MBSAQIP programs are measured equitably, with the same set of standards and uniform definitions which describe patient demographics, comorbidities, and postoperative events. This robust data registry is an excellent resource for programs to maximize their opportunity to correct deficiencies identified during planned and deliberate data reviews. Participating in a program with standardized data collection coupled with the infrastructure afforded by accreditation provides immeasurable value for patients as they receive care with greater efficiency, higher quality, and lower complications.

Questions

1. Why are quality improvement efforts important in metabolic and bariatric surgery?
   Quality improvement (QI) efforts are essential to guide safe and efficacious practices for those patients undergoing metabolic and bariatric surgery. Data measurement is critical to drive QI efforts, as we cannot improve what we do not measure. A program such as MBSAQIP provides the necessary tools to drive local QI efforts for accredited centers by providing them with the standards and the necessary data for which to do this.
2. What are the benefits of prospectively collected, risk-adjusted data which follow uniform definitions?
   In the case of MBSAQIP, prospectively collected, clinically derived data is essential for metabolic and bariatric surgery programs to measure their quality improvement efforts because it is collected contemporaneously following standardized definitions, which enables hospitals to be assured that all participating sites are being measured against one another in a uniform fashion. For example, claims-based data is collected retrospectively which can be subject to error or subjective interpretation.
3. What are the four guiding principles of Continuous Quality Improvement, as outlined by the American College of Surgeons?
   Set the standards, build the right infrastructure, collect robust data, and verify through a third party.
4. Who developed the concept of the "end result idea"?
   Ernest Amory Codman, MD, FACS
5. Which surgeon is often considered the "pioneer" of metabolic and bariatric surgery?
   Edward E. Mason, MD, FACS

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Lessons Learned from ACS NSQIP

3

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Abbreviations

ACS	American College of Surgeons
NSQIP	National Surgical Quality Improvement Program
PUF	Participant use data file
SAR	Semiannual report
SCR	Surgical clinical reviewer
VA	Veterans affairs

Key Take-Home Points

- Surgical quality improvement began in earnest in the early 1990s.
- The American College of Surgeons National Surgical Quality Improvement Program (ACS NSQIP) is the culmination of nearly 30 years of quality improvement efforts.
- Participation in ACS NSQIP requires at least two dedicated, quality officers in the roles of Surgeon Champion and Surgical Clinical Reviewer.
- Hospital-level feedback provided in risk-adjusted Semiannual Reports has been demonstrated to be a powerful quality improvement tool.
- ACS NSQIP continues to grow and expand the boundaries of what clinical registries are capable of providing participating hospitals.
- Successful registry-based quality improvement programs must provide excellent data feedback to hospitals and cultivate local support in order to succeed.

Origins and Early Development

Surgical quality came to the forefront of the American healthcare system in the early 1980s. The quality of care for patients undergoing surgery in the United States Veterans Affairs (VA) hospital system came under scrutiny at that time. Anecdotal evidence seemed to indicate that the operative mortality within the VA system was above the national average, with resulting legislation mandating that VA hospitals compare risk-adjusted surgical outcomes to a calculated national average. The resulting policies helped kick-start a decades-long focus on surgical quality.

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