# The evolution of the surgery morbidity and mortality conference

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For nearly 90 years, the surgery morbidity and mortality conference (M&M) has been used for educational, peer review, and quality assurance purposes.[1,2] It has evolved in parallel with a better understanding of patient safety and the complex factors that underly adverse medical outcomes.[3-5] With its open and frank discussion of death and medical complications, this conference is essential to the training of thoughtful, accountable surgeons.

Most surgeons are aware of Dr. Codman's "End Results System" and its contribution to the development of the Surgery M&M conference.[5,6] However, there is a lesser-known, tragic side to this story that is equally important.[6,7] Being a visionary is great, but without common sense, good judgment, emotional intelligence, and personal humility, well-intentioned works can too easily be ignored.

**E. Amory Codman, MD, FACS.** Public Domain

## History of the M&M conference

The concept of accountability for clinical outcomes is not new. The Hippocratic Oath states, "I will abstain from all intentional wrong-doing and harm."[8] McIntyre and Popper identified several other critical milestones,

including Percival's *Medical Ethics*, published in 1849, and Nightingale's *Notes on Hospitals*, published in 1863.[9] They also referenced the remarkable 1908 article by the British surgeon E.W. Hey Groves entitled "Surgical Statistics: A Plea for a Uniform Registration of Operation Results."[9,10]

Groves believed that the surgical literature of the time presented an overly-optimistic picture of surgical outcomes to medical colleagues and the public.[10] He proposed the creation of a mandatory national registry of major surgical operations (funded and maintained by the British Medical Association), with annual publication of overall surgical results for Britain. The goal was to improve surgical outcomes nationally. This radical proposal was not acted on by the British Medical Association.

At the same time, a young American surgeon was having similar thoughts about the necessity of analyzing and publicly disseminating real-world clinical results, as a means of improving surgical care.[7] Codman was a prominent Boston surgeon of the early 20th century, working at the Massachusetts General Hospital (MGH). He will be forever recognized as the creator of a method for tracking and disseminating the outcomes of medical and surgical care. In 1911, Codman founded the End Results Hospital, a private 12-bed hospital that cared for 337 patients during more than five years.

He published those patient outcomes, including 123 adverse outcomes, in 1918.[11] In 1911, Codman was also appointed as the first Chair of the American College of Surgeons' Committee for the Standardization of Hospitals, the forerunner of today's Joint Commission.[7]

Codman's classification of medical errors was remarkably modern and included error due to lack of technical skill or surgical knowledge; error due to lack of surgical judgment; error due to lack of care or equipment; and error due to diagnostic skill.[11] He also referenced patient factors that contributed to poor patient outcomes, namely the patient's "unconquerable disease," and their refusal of treatment.[11] In addition, there were those "accidents and outcomes" over which the clinician has no control, which Codman termed "the calamities of surgery."[11]

The first modern M&M conference, a meeting of medical colleagues to formally review and discuss surgical case outcomes, was the Anesthesia Mortality Committee, established in 1935 by the Philadelphia County Medical Society, under the leadership of Dr. Henry S. Ruth.[12] Presentation of cases (primarily early postoperative deaths) at this meeting was voluntary, with the presentations being made by the involved anesthesiologist. The responsible surgeons could attend the meeting and comment, but were not expected to do so. Some individuals apparently feared that conference attendees might judge poorly those practitioners (including the surgeons) whose cases were presented.[12,13]

By 1983, the Accreditation Council for Graduate Medical Education had incorporated this conference into the accreditation standards for all residency programs.[9] However, in many non-procedural disciplines, that conference has more closely resembled a clinicopathologic conference—a presentation of an interesting case (perhaps a death, with autopsy findings), but without specific discussion or analysis of the cases of adverse clinical outcomes.[14-16]

In *Forgive and Remember: Managing Medical Failure*, the sociologist Charles Bosk describes how surgical residents respond to the adverse medical events they witness, and those of which they may be a part.[17] He describes the surgery M&M conference as a "grieving and healing" process for "unexpected failure."[17]

Bosk regarded the M&M process as critical to the acculturation of residents into the "society of surgeons."[17] Residents, or faculty, who are unwilling or unable to "wear the hair shirt," to publicly confess their clinical "sins" and request forgiveness from their colleagues, were either excluded from membership, or subsequently ostracized from that society.[3,17]

More than 45 years after publication of the inaugural edition of Bosk's book, there have been substantial changes in the analysis of surgical outcomes and the manner in which cases are presented and discussed at surgical M&M conferences. The "blame and shame game" has been replaced by a broader, more nuanced and constructive view of surgical quality, patient safety and the assessment of "adverse medical outcomes."[3-5] In general, today's M&M conferences are more civil experiences for surgical trainees, but undoubtedly there are variations between institutions.

## Codman revisited

The definitive biography of Codman, *Ernest Amory Codman: The End Result of a Life in Medicine,* was written by Dr. Bill Mallon, a clinical faculty member in orthopedic surgery at Duke University.[7]

Codman was a true medical polymath, with notable accomplishments in anesthesiology, radiology, general surgery, and orthopedics. In collaboration with Drs. James Ewing (AΩA, Weill Cornell Medical College, 1910), and Joseph Bloodgood, Codman developed the nation's first tumor registry, devoted to bone sarcomas.[7] His

monograph on shoulder surgery was for many years the definitive text on that topic.[7,18]

Codman's accomplishments in surgical quality improvement were seemingly long forgotten. To understand how Codman came to develop and apply his End Results System, and why his recommendations were largely eschewed by his colleagues, one needs to understand Codman the man. Mallon has provided context both to Codman's great accomplishments, but also to his tragic professional downfall.[7]

Codman was obsessive about his outcomes in domains of medicine and beyond. A life-long hunter, he kept meticulous records of the outcomes of his hunting trips for more than 40 years.[7] Codman was proud and privileged, born into a prominent Boston family. This Brahmin surgeon attended exclusive schools and then married into another well-established Boston family.

He was deeply frustrated with the seniority system at MGH. He was suspicious of the wider Boston medical community, believing that doctors and hospitals purposely did not disclose poor clinical results for fear they might compromise reputation and monetary gain. Codman passionately believed that a surgeon with excellent clinical outcomes should, by rights, receive personal recognition, professional advancement, and financial success.

Codman had the tragically naive belief that public disclosure and "shaming" of poor surgeons would lead to meaningful institutional change and improvements in clinical care.[7] He was, to say the least, emotionally "tone-deaf."[7] Codman had both great personal gifts and flaws, and tragically, those conflicting personal characteristics combined one fateful evening in January 1915, to inexorably change his life.

Codman expected that the announcement, "A Meeting for the Discussion of Hospital Efficiency at the Boston Medical Library, Wednesday, January 6th, 1915, at 8:15 PM, under the Auspices of the Surgical Section of the Suffolk District Medical Society," would be the culmination of his efforts to gain regional, if not national, recognition of his End Results System. He carefully planned the program, which featured five speakers, each addressing hospital efficiency (today's hospital quality) from their unique perspectives as a public servant (a local government official), an industrial efficiency expert, a clinical surgeon, a hospital administrator, and a hospital trustee.[7] Following these formal presentations, Codman was to give the closing remarks.

The meeting was widely advertised in Boston medical circles, and covered by the press. Multiple luminaries had been invited, including the colorful first-term mayor of


**The Back Bay Golden Goose cartoon.** Courtesy of Harvard Medical Library collection, Center for the History of Medicine in the Francis A. Countway Library, Harvard University

Boston, James B. Curley. Curley led off the evening's festivities as the public servant, but then left for other commitments, missing the fireworks at the end of the meeting.

Also notable were the invitees who chose not to attend. These included Abbott Lawrence Lowell, President, Harvard University, and Dean, Harvard Medical School.

After two hours of presentations, Codman rose from the audience, and his friend, Frank Gilbreth (the efficiency expert who previously presented) pulled back the curtain on the cartoon "Back Bay Golden Goose." This water color cartoon was drawn by local artist Philip Leslie Hale, and can be found today at Harvard's Countway Library.[19]

The Golden Goose represents the hapless citizens of Boston. Her head is stuck in the sand, proclaiming, "If I only dared look and see, I might find a doctor who could cure my own ills."[19] At the same time, the goose is kicking her golden eggs to the members of Boston's medical establishment, who are getting rich at her expense. President Lowell lamented, "I wonder if clinical truth is incompatible with medical science? Could my clinical professors make a living without humbug?"[19]

Codman's remarks numbered about 700 words and focused solely on the contents of the cartoon.[7] He challenged members of the audience to consider why anyone would knowingly accept such humbug.

After soliciting, and then brusquely answering several questions from the audience, Codman declared the meeting closed, and returned to his seat. If he thought the audience would see his presentation as humorous satire, or as a justified exposé of a deeply flawed Boston medical system, or that his cartoon and comments would be greeted approvingly with laughter and applause, he was sadly mistaken. Instead, he was greeted with boos, and many in the audience stormed out in anger. If Codman was surprised or disappointed by this response, he never acknowledged such, and, to his deathbed, remained unrepentant for what he had said and done.

The results of the meeting were predictable and tragic. The cartoon made front page news in several Boston newspapers. Shortly, thereafter, Codman was asked by the Suffolk District Medical Society to step down as Chair of its Surgical Section.[7] He was shunned by nearly all his colleagues, although he did receive lukewarm supportive letters from his friends William Mayo, MD (AΩA, University of Michigan Medical School, 1927), and Harvey Cushing, MD (AΩA, Harvard Medical School, 1914).

Upon hearing the news on December 6, 1917, of the Halifax Harbor Explosion, Codman immediately closed the End Results Hospital and brought his team to Halifax. The explosion of a military munitions ship resulted in more than 3,000 deaths. He then enlisted in the Army, and for the next three years conducted oversight of several United States military hospitals. The End Results Hospital, which had been struggling financially, never reopened, and was eventually converted to a boardinghouse that Codman owned.[7]

His monograph, *A Study of Hospital Efficiency*, was published at his own expense in 1918, with reprintings in 1919 and 1920.[11] He thereafter focused his efforts on his Bone Sarcoma Registry, using office space lent to him at MGH to store registry records.[7] His text on shoulder surgery, *The shoulder: rupture of the supraspinatus tendon and other lesions in or about the subacromial bursa*, was published in 1934.[18]

Codman received several late-life recognitions including election as an honorary member of the New England Roentgen Ray Society in 1927, and the Gold Medal of the American Academic of Orthopaedic Surgeons in 1939.[7] He died of malignant melanoma in 1940, at age 70, alone in his country house outside of Boston.[7]

## Outcomes of the End Results System

In 1917, several years after he stepped down as chair of the ACS Committee on Standardization of Hospitals, that committee published its first accreditation standards for U.S. hospitals.[7] That document included many critical items including standards for medical staff organization; qualifications for medical staff membership: rules and policies governing professional work in hospitals; requirements for medical records; and requirements for diagnostic and therapeutic facilities within hospitals.[7] As pointed out by Mallon, it is equally important to note items that were not included in these standards but were ones Codman had championed as the first committee chair, including the analysis (and publication) of clinical outcomes, and the identification of avoidable errors.[7]

In 1951, the ACS Committee on the Standardization of Hospitals joined with other organizations to form the Joint Commission for the Accreditation of Hospitals, now the Joint Commission.[7] That body eventually established requirements for hospital peer review and the incorporation of hospital clinical performance standards into the hospital accreditation process. Codman's dream of surgeon and hospital accountability for clinical outcomes was realized.

In 1996, the Joint Commission created the Codman Award "to showcase the effective use of performance

measures, thereby enhancing knowledge and encouraging the use of performance measurement to improve the quality and safety of health care."[20] The Joint Commission has designated Codman as "The Father of Outcomes Measurement."[20]

## The surgery M&M conference

Codman was the first U.S. surgeon to strongly advocate for the disclosure and analysis of clinical outcomes, and in so doing created the necessary criteria for an effective M&M conference—accountability to ourselves and our colleagues for good clinical outcomes. His pioneering work on the Bone Tumor Registry also set the stage for the establishment of national registries for the analysis of clinical outcomes—entities such as the National Surgical Quality Improvement Program, Trauma Quality Improvement Program, and state tumor registries.

However, in other ways, he cannot be credited with creating the M&M conference, as that distinction must continue to rest with Philadelphia's Anesthesia Study Commission. The fundamental premise of the surgery M&M conference is the presentation and collegial discussion of adverse clinical outcomes among peers. For Codman, there really was no such discussion. He served as the judge and jury, at least for the outcomes at the End Results Hospital where most of the patients were his. The audience for Codman's analysis of adverse medical outcomes was the general public, not his peers. Although he did pioneer seminal medical outcomes analysis, unfortunately he went about it in a way that alienated others. He paid a significant personal price for the "Back Bay Golden Goose" cartoon, and his very public diatribe.

Codman's work laid the foundation for the development of clinical outcomes research; the establishment of national quality databases; the linkage of hospital accreditation to clinical outcomes; and to the eventual public disclosure of clinical outcomes by Centers for Medicare and Medicaid Services and Leapfrog. The surgery M&M conference and medical outcomes analysis continue to play central roles in surgical education and institutional quality assessment.

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