

E.A. Codman and the End Results Idea: A Commentary

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BASED ON MY OWN EXPERIENCE IN CLINICAL research regarding health outcomes, I would like to make some personal observations that reinforce the potential power of Codman's simple idea: that we can learn from the accumulation and orderly compilation of collective clinical experience. Then I would like to pose some questions about why the idea met with such stubborn resistance in Codman's time—why he sometimes felt like a quixotic figure at best and, at worst, a failure. It may be that we can learn enough from history to avoid repeating mistakes as we rediscover and repackage "end results" as "outcomes research."

My first clinical research experience was quintessential "end results" research at Massachusetts General Hospital; the objective was to determine the results of medical intensive care. For over six years, we documented the clinical circumstances of admission, intensive care unit and hospital stay, and hospital discharge diagnoses for more than 6,000 admissions to our intensive care unit. We conducted follow-up interviews and were able to ascertain end results for more than 90 percent of these patients (Thibault et al. 1980). Our computer-based registry was a wonderful resource for education—ours and our colleagues'. We were able to define the process of our clinical work in the intensive care unit and its product. As a result we changed our process, sometimes, as in the case of patients admitted with suspected myocardial infarction, dra-

matically so (Mulley et al. 1980). Our data did not support the well-entrenched practice of monitoring all patients admitted with this diagnosis in the unit for a minimum of 3 days. Our careful documentation of clinical experience in our institution allowed us to break ranks and develop a more flexible approach. Others followed. In this particular case, the power of the end results collected for fewer than 400 patients with suspected myocardial infarction was enormous, changing clinical care for hundreds of thousands of patients admitted annually to hospitals across the United States. The disproportionate impact could not be explained by unassailable evidence produced by rigorous research, but rather by the pre-existing vacuum. There was no objective evidence to support the earlier practice. That such a vacuum exists for many practices has been increasingly recognized (Eddy and Billings 1988).

The database ultimately spawned nearly a dozen publications and, in that narrow sense, would have to be considered a success. But the evident impact on clinical practice just cited was the exception rather than the rule. In part, because what began as a simple idea became incredibly complicated as we and other investigators wrestled with questions of severity and comorbidity adjustment, and the validation of clinical prediction models necessary to make past experience useful for future decision making. A tension emerged between methodologic rigor and feasibility. Though constructive in the long run, this force would often draw energy and effort away from what was most clinically relevant. Furthermore, when we tried to inform clinical decisions by narrowing confidence intervals around probabilities, we ran headlong into the realization that many if not most of the decisions were far more sensitive to the highly variable value judgments that had to be rendered about outcomes than to the probabilities of those outcomes, at least within the limits of our powers to predict. This was particularly problematic in the intensive care setting because of the life and death character of the decisions and the pace of decision making. Societal values play a more prominent role—along with those of patients, family members, and physicians—than in other care settings.

More recently, I have been involved with outcomes research with a geographic population base rather than a hospital base. My colleagues and I have focused on outcomes associated with benign prostatic hypertrophy and the decision of whether or not to undergo prostatectomy.

We began with an end results orientation that would please E.A. Codman. In addition to analyses of over 16,000 Medicare claims to provide less-biased estimates of objective outcomes, such as operative mortality, we conducted a survey of more than 400 patients before and after, at three monthly intervals, their surgical procedure (Wennberg et al. 1987; Fowler et al. 1988). The interviews allowed us to determine expectations and outcomes as well as to explore differences in patients' value judgments or utilities. We used this outcome data to construct a decision-analysis model and identify the key probabilities and their importance in decision making relative to the key value judgments that should be made by patients (Barry et al. 1988). We are now involved in a project designed to organize and deliver the information about probabilities and about utilities to the different stakeholders—patients, clinicians, and societal agents involved in decisions about prostatectomy—in a manner that will facilitate outcomes research designed to improve continuously the information base for future decisions (Wennberg et al. 1988).

Now, back to the questions about Codman's frustration. Why was such a simple idea so strongly resisted? An answer might be that it was not so simple. Codman wanted to inform decisions and thereby improve the efficacy of medical care. However, outcome information is a necessary but not sufficient element in any strategy to improve decision making.

A more complete strategy would include steps to improve access to, and organization of, available knowledge and to help clinical decision makers avoid errors in reasoning and logic that reflect unwitting deviations from the axioms of rational decision making. While limited rationality of decision making can be documented in many disciplines, few professionals make decisions that so profoundly affect the quantity and quality of life as do physicians. More self-conscious examination of the way doctors manage information and make decisions should become a focus for educational reform in medical schools and in clinical practice.

A complete strategy would also include steps to ensure a decision process that paid due respect to both the importance of individual patients' preferences and to societal interests that justify, depending on circumstances, either promotion or constraint of clinicians' and patients' decision-making autonomy. Any such strategy must recognize

that the complexity is increased by the necessary sharing of clinical decision-making responsibility among clinicians, patients, and policy makers who act as societal agents (Mulley 1989b).

Consider the contrast between E.A. Codman's single-minded obsession with end results and the far more subtle interplay among structure, process, and outcome—or even the concentric circles of the bull's-eye—that Dr. Donabedian has used to distinguish not only levels at which quality of care may be assessed, but also the loci of responsibility for decision making and care that produce health outcomes (Donabedian 1988).

Codman's single-mindedness may simply reflect the fact that the resistance of his colleagues—after all, knowledge is power and power threatens—never allowed him to get past first base. We can blame the failure in his story on the recalcitrance and self-interest of his contemporaries as well as on his more than occasional tactlessness and quixotic character. But I suggest that as we embrace outcomes research, and try to convert new information to better clinical and policy decisions, we think carefully about the complexity of the task. We need to define better the difficult rational agency role of the clinician to provide the patient with information and vicarious experience about outcomes so that informed value judgments can complement informed probability estimates. We need more effective means to detect differences, and help patients recognize differences, in their wants and needs and attitudes toward risk (Mulley 1989a). We need to communicate outcome information to policy makers with a clear distinction between matters of fact and matters of value, so that at least we can better understand any basis for consensus or the lack of it (Mulley and Eagle 1988).

If, as we gather information about outcomes, we clearly recognize the complexity of decision making—decision making necessarily shared by those with different perspectives and different values—we may be better equipped to realize more fully the potential of the simple idea of E.A. Codman and provide the vindication that was so important to him.

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