From Craft to Profession: The Path to Highly Predictable Cancer Care

By Joseph O. Jacobson, MD, MSc

Dana-Farber Cancer Institute, Boston, MA

The training of medical oncologists and the way that routine care is provided have changed little over the past half century. Yet there is growing recognition and urgency that the practice of the medical oncologist must change fundamentally to enable the delivery of consistent, high-quality care and to manage resources judiciously. To achieve these objectives, we must shed our craft-based roots and embrace care informed by improvement science. If implemented thoughtfully and respectfully, improvement science can be introduced into routine care, and when paired with changes in delivery systems, high-value cancer care provided with high predictability will be achievable. The steps to reach this goal are outlined below.

Level 0 Predictability: Craft-Based Medicine

William Osler is credited with moving the practice of medicine from its origins as a 19th-century guild to a craft.¹ Before Osler, medicine was not unlike many other European guilds that had thrived for centuries using a model that relied on long apprenticeships eventually leading to master status.² Osler brought the nascent knowledge of pathophysiology directly to the bedside, incorporated the rapid growth of medical knowledge and applied his extensive experience as a clinician to craft a customized solution intended to perfectly meet the needs of an individual patient. Oslerian medicine, which still dominates much of our care, is best viewed as an intuitive art, one in which the ability to deliver care is firmly embedded in the caregiver, not in the system or in distinct processes.¹

Although ostensibly an ideal model, one that appears to be quintessentially patient centered, craft-based medicine is fraught with risks that may result in misdiagnosis and mistreatment. These are summarized in Table 1. Most important among these is our tendency to rely on heuristics, defined as “a rapid path to an adequate, often imperfect, answer to difficult question” or more commonly as a rule of thumb.⁵ These mental shortcuts often lead us to consider only a limited number of diagnostic or therapeutic options and to unconsciously exclude others. The most damaging example of this for many physicians is “last case bias.” An example of the availability heuristic, this colors our clinical judgment by its proximity to, or similarity to, the patient at hand. Other common heuristics that increase our vulnerability are “anchoring” (being influenced by first impressions), “framing” (vulnerability to wording or subtle clues), and premature closure (leaping to conclusions).⁵ In addition

to reliance on heuristics, most clinicians, not unlike many scientists and mathematicians, have only a limited, often flawed, understanding of probability, which greatly diminishes our ability to manage uncertainty.⁶

Craft-based medicine is highly dependent on clinician preference. Sackett and Holland³ described two extremes of physicians: evangelists and methodologists. Using screening for a condition as an example, evangelists advocate for early adoption on the basis of the argument that the risks of disability and death make waiting for conclusive evidence of efficacy morally bankrupt. Methodologists, on the other hand, argue with equal fervor that waiting for conclusive evidence of efficacy is vital to avoid exposing patients to unproven approaches that may carry significant risks. In fact, even when evidence of effectiveness is present, clinicians adopt new practices at different rates, partly as a result of personal differences in willingness to accept risk. Berwick,⁷ borrowing from the classic paradigm of E.M. Rogers, classified physicians into five idealized categories: innovators (2.5%), early adopters (13.5%), early majority (34%), late majority (34%); and laggards (16%).

Clinicians are further influenced by professional and financial interests, malpractice concerns, and pressure from patients and families. In addition, we are not immune from our own emotions. Empathy is strong among clinicians and is another source of bias that may steer us inadvertently to sacrifice our objectivity. When unchecked, craft-based medicine can result in widespread harm. The epidemic of autologous stem-cell transplantation for women with metastatic breast cancer in the 1990s was at least partly the result of each of the elements outlined in Table 1 combining to create an evangelical belief in an unproven, toxic, expensive treatment that ultimately proved to no better than standard chemotherapy.⁸

Despite its richness and tradition, craft-based medicine is inherently an unsystematic cataloguing of clinical observations that places overemphasis on authority.¹ For all these reasons, I list craft-based care as demonstrating level 0 predictability.

Level 1 Predictability: Empirical Medicine

Empirical medicine forms a bridge between craft-based intuitive medicine and profession-based care (Figure 1). It is grounded in the principles of evidence-based medicine.⁹ It requires that clinicians have access to a moderately precise under-

Table 1. Challenges of Craft-Based Medicine

1. Cognitive failures. Over-reliance on heuristics
2. Limited understanding of probability, challenges of managing uncertainty
3. Provider preferences
(a) "Evangelists" v "snails" ³
(b) Risk averse v risk-taking
4. Professional and financial interests
5. Malpractice concerns, patient and/or family pressure
6. Loss of objectivity
Empathy: the power of projecting one's personality into (and so fully comprehending) the object of contemplation ⁴

Figure 1. Moving from craft to profession via the bridge of empirical medicine. EBM, evidence-based medicine.

standing of a patient's disease and stage, as well as some knowledge of the outcome of interventions.

With this information, and the use of simple tools of probability (eg, Bayes' theorem), correlations can be drawn between actions and outcomes that permit the creation of scenarios that clinicians and patients can use to make informed decisions. In medical oncology, decision support tools such as Adjuvant Online¹⁰ demonstrate the power of empirical medicine to combine available data with analytic tools, thus enabling clinicians and patients to participate in shared decision making.

The greatest challenge of empirical medicine in cancer care is the limited evidence for routine decision making in medical oncology. Poonacha and Go¹¹ reviewed 1,023 clinical practice guideline recommendations from the National Comprehensive Cancer Network for 10 common malignancies and identified level 1 recommendations (high-level evidence with strong consensus) in only 6%. Similarly, Djulbegovic et al^{12,13} found that among 1,000 key decisions related to direct cancer care, only 24% were supported by reliable evidence. Because of the limited evidence base, and the requirement to generalize clinical trial results obtained in highly constrained research settings to unselected patients with cancer, empirical medicine is best categorized as having level 1 predictability.

Table 2. Elements of Profession-Based Care Delivery

1. Systematic, with care provided according to predetermined decisions whenever possible
2. Highly reliable (safe, efficient)
3. Meaningful measurement of structure, process, culture, and outcomes
4. Actively manages variation
5. Attentive to context
6. Consistently sensitive to patient, family, and societal needs

Level 2 Predictability: Profession-Based Care

Compared with empirical medicine, profession-based medicine is embedded in care processes and in supporting technology, rather than exclusively resident in individual capacities.¹ It is highly dependent on the principles of improvement science (Table 2).¹⁴ Core among these is that care must be systematized, predetermined, and based on tools of high reliability.¹⁵ Incorporating this paradigm shift requires the ability to measure across the domains of institutional infrastructure, processes of care, organizational culture, and patient outcomes. Tracking processes and outcomes allows for continuous learning along with the identification of, and elimination of, unwarranted variation.

Intermountain Healthcare has created an effective structure for providing profession-based care.¹⁴ Four key elements include (1) groups of peers treating similar patients in a shared setting, (2) coordinated care delivery processes (Intermountain refers to these as clinical practice guidelines¹⁶), (3) standardized treatment approaches in which individual clinicians are expected to adapt to specific patient needs, (4) regular assessment of key processes and outcomes of care.¹⁴ In this model, clinical practice guidelines are not static tools but are dynamic instruments intended to be regularly updated and bypassed when clinically indicated.^{16,17} This approach encourages variation due to differences in patient characteristics, but discourages unwarranted variation due to unjustified differences in practice. It is the antithesis of cookbook medicine.¹⁸

Level 3 Predictability: The Future State of Production

The future of cancer care delivery relies on the elements of empirical medicine and profession-based care, but it also requires building effective teams organized around the well-being of the patient. These elements alone, though, will not achieve the goal of highly predictable care. To accomplish that goal in medicine, akin to that routinely achieved in commercial aviation and the nuclear power industry, four additional elements are required. First, failures in care processes must be dramatically reduced by using high-reliability principles.¹⁵ Second, unprecedented use of existing informatics to manage available data is required. This will permit the ability to track adherence to care at key decision points so that variation can be managed and processes can be linked to outcomes. Third, rapid advances in genomics (here defined broadly to include the study of large, comprehensive biologic data sets) will allow more precise cancer diagnoses, enabling the use of targeted therapeutics. Finally,

personalized medicine—the biologic and nonphysiologic predictors of patient response to therapy—must be incorporated into decision making.¹ During this evolution, if we do not forget that “the secret of the care of the patient is in caring for the patient”,¹⁹ cancer medicine will have achieved a new era.

Acknowledgment

Presented as an abstract at the ASCO Quality Care Symposium, San Diego, CA, November 30-December 1, 2012.

References

1. Christensen CM, Grossman JH, Huang JH: The Innovator's Prescription: A Disruptive Solution for Health Care. New York, McGraw Hill, 2009
2. Sox HC: Medical professionalism and the parable of the craft guilds. *Ann Intern Med* 147:809-810, 2007
3. Sackett D, Holland W: Controversy in the detection of disease. *Lancet* 306:357-359, 1975
4. The Compact Oxford English Dictionary (ed 2). Oxford, United Kingdom, Clarendon Press, 1991
5. Kahneman D: Thinking Fast and Slow. New York, NY, Farrar, Straus, Giroux, 2011
6. Tversky A, Kahneman D: Judgment under uncertainty: Heuristics and biases. *Science* 185:1124-1131, 1974
7. Berwick DM: Disseminating innovations in health care. *JAMA* 289:1969-1975, 2003
8. Rettig RA, Jacobson PD, Farquhar CM, et al: False Hope: Bone Marrow Transplantation for Breast Cancer. Oxford, United Kingdom, Oxford University Press, 2007
9. Evidence-Based Medicine Working Group: Evidence-based medicine: A new approach to teaching the practice of medicine. *JAMA* 268:2420-2425, 1992
10. Adjuvant Online: www.adjuvantonline.com

Author's Disclosures of Potential Conflicts of Interest

The author(s) indicated no potential conflicts of interest.

Corresponding author: Joseph O. Jacobson, MD, MPH, Dana-Farber Cancer Institute, Dana 1234, 450 Brookline Ave, Boston MA 02215; e-mail: jjacobson@partners.org.

DOI: 10.1200/JOP.2013.001029

11. Poonacha TK, Go RS: Level of scientific evidence underlying recommendations arising from the National Comprehensive Cancer Network clinical practice guidelines. *J Clin Oncol* 29:186-191, 2011
12. Djulbegovic B, Loughran TP Jr, Hornung CA, et al: The quality of medical evidence in hematology-oncology. *Am J Med* 106:198-205, 1999
13. Vincent S, Djulbegovic B: Oncology treatment recommendations can be supported only by 1-2% of high-quality published evidence. *Cancer Treatment Reviews* 31:319-322, 2005
14. James BC, Savitz LA: How Intermountain trimmed health care costs through robust quality improvement efforts. *Health Aff (Millwood)* 30:1185-1191, 2011
15. Resar RK: Making noncatastrophic health care processes reliable: Learning to walk before running in creating high-reliability organizations. *Health Serv Res* 41:1677-1689, 2006
16. James B: Quality improvement opportunities in health care: Making it easy to do it right. *J Manage Care Pharm* 8:394-399, 2002
17. Rathod RH, Farias M, Friedman KG, et al: A novel approach to gathering and acting on relevant clinical information: SCAMPs. *Congenit Heart Dis* 5:343-353, 2010
18. Jacobson JO: Counterpoint: Sowing the seeds of standardized care to reap better patient outcomes. *J Oncol Pract* 8:236-238, 2012
19. Peabody FW: The care of the patient. *JAMA* 88:877-882, 1927