

Gizmo Idolatry

Bruce Leff, MD

Thomas E. Finucane, MD

IT SEEMS THAT “GIZMO IDOLATRY” NOW EXISTS IN THE PRACTICE of medicine. “Gizmo” is defined by the American Heritage Dictionary as “a mechanical device or part whose name is forgotten or unknown; a gadget.” In this article, gizmo is used to refer to a mechanical device or procedure for which the clinical benefit in a specific clinical context is not clearly established, and gizmo idolatry refers to the general implicit conviction that a more technological approach is intrinsically better than one that is less technological unless, or perhaps even if, there is strong evidence to the contrary. The credulous acceptance and rapid diffusion of frontal lobotomies in the 1930s and 1940s led to great harm, and to a Nobel Prize for Egas Moniz in 1949 “for his discovery of the therapeutic value of leucotomy in certain psychoses.”¹ Autologous bone marrow transplantation for breast cancer² is a more recent example of gizmo idolatry. The widespread belief in and unintended consequences of technology have been described from several perspectives,³ including medical.⁴ In this Commentary, we examine factors that promote, and harms that could result from, gizmo idolatry in a market-driven society that is aging.

Clinicians make many decisions under conditions of uncertainty. Equipose is a small subset of uncertainty, and clinical judgment depends on much more than coin-tossing. A particular technology may be a gizmo in one clinical context and not in another: where evidence for effectiveness is strong, the gizmo quotient will be low. Thus, performing an echocardiogram, carotid endarterectomy, coronary angioplasty, or endoscopy may be best practice or may be unalloyed gizmo idolatry, depending on the situation. Evidence about new technology is often inconclusive, however, and in many commonly encountered situations the gizmo quotient will be moderate. That utilization varies widely by region for several devices and procedures, with no better clinical outcomes in high-use regions,⁵ provides strong indirect evidence that gizmo idolatry exists and affects clinical practice.

Seven overlapping categories of incentives may encourage clinicians and patients to favor the use of gizmos.

Common Sense Appeal

Many gizmos make so much sense, in the absence of evidence or even the presence of evidence to the contrary, that their value or utility is persuasive *prima facie*. For example,

if coronary artery occlusion causes myocardial infarction, opening the occlusions postinfarction makes sense.⁶ If coronary artery bypass graft surgery has significant morbidity and mortality, perhaps stents are the solution. If bare metal stents develop thrombosis, drug-eluting stents can reasonably be expected to be better. The above reasoning proceeds despite evidence that angiographically defined coronary stenosis is a poor predictor of subsequent occlusion and infarction in patients with stable angina.⁷ The face value and common sense appeal of such interventions contribute to their widespread diffusion, more rapidly than evidence alone could justify.

Human Love of Bells and Whistles

Increasing the technological complexity of treatment appears to increase the significance of an illness and the appeal of an intervention. Furthermore, if hospitalization is required, additional distinction may be conferred. For instance, good evidence demonstrates that oral rehydration during acute diarrheal illness is at least as good as intravenous therapy.⁸ For most patients, metered-dose inhalers are as effective as nebulized bronchodilators, but inhalers are generally regarded as lesser treatments.⁹ The gadgetry of gizmos somehow provides cachet, and electrified intravenous pumps and nebulizer machines seem more substantive.

Exploits vs Uneventful Diligence

In *The Theory of the Leisure Class*, Veblen¹⁰ noted that in early societies, the upper leisure class performed high-prestige hunting and military exploits, while the lower classes performed menial work, such as agriculture, child-rearing, and cooking, which was arguably more important to survival of the society. Vestiges of this construct persist in medicine where surgical exploits are valued more highly than uneventful diligence or watchful waiting of primary care. Recovery from backache can be transformed into a patient's exploit if magnetic resonance imaging is obtained, and even more so if this leads to surgery. Lifestyle changes are as effective as drugs or surgery for incontinence, for insomnia, and for many other conditions, but lifestyle changes are quintessentially uneventful diligence. Among other allures, the executive or VIP physical examination confers upon the pa-

Author Affiliations: Department of Medicine, Johns Hopkins University School of Medicine (Drs Leff and Finucane), and Johns Hopkins University Bloomberg School of Public Health (Dr Leff), Johns Hopkins Bayview Medical Center, Baltimore, Maryland.

Corresponding Author: Bruce Leff, MD, Johns Hopkins Bayview Medical Center, Johns Hopkins Care Center, John R. Burton Pavilion, 5505 Hopkins Bayview Cir, Baltimore, MD 21224 (bleff@jhmi.edu).

tient some aura of exploit and a dignified sense of accomplishment. Higher costs, too, could be tied to Veblen's idea of "honorific waste" and "conspicuous consumption,"¹⁰ desirable ends in their own rights.

Gizmo Utilization as Proof of Competence

The cutting edge or first on the block use of a gizmo can bestow on the physician a mantle of expertise, competence, and preeminence. Off-pump coronary artery bypass graft surgery, computed tomographic detection of coronary artery calcification, or positron emission tomographic scans to diagnose Alzheimer disease may dazzle, even if there is little or no evidence that the patient will benefit.

Gizmo as Source of Objective, Quantifiable Information

Gizmos are used to provide objective, quantifiable information, often used to rule out a diagnosis. For patients who are frail and face the risk of surgery, technological preoperative testing shows that the patient received a thorough evaluation, although this testing does not produce better outcomes than a thorough clinical examination, assessment of functional capacity, and basic laboratory testing.¹¹ A patient with exertional chest discomfort can obtain definitive information about fixed obstructions in his coronary anatomy via cardiac catheterization. A patient with a neurological complaint and nonfocal examination may receive a clean bill of health with normal findings on magnetic resonance imaging of the brain.

Proof Against Negligence

The risk of malpractice litigation depends heavily on a physician's communication skills,¹² but a totemic belief persists that gizmo deployment reduces the risk of litigation. Defensive medicine is based in large part on the idea that use of technology represents a higher and more defensible quality of care. Special beds, mechanical devices intended to prevent pressure sores, are part of the nursing home landscape and represent evidence *prima facie* that patients are not being neglected. The effectiveness of these devices for any meaningful pressure sore outcome has not been established.¹³ Similarly, tube feeding lacks evidence of meaningful benefit in patients with advanced dementia.¹⁴ Nevertheless, the death of a very thin, demented, bedfast nursing home resident with pressure sores may be less likely to lead to litigation if that patient died with dietary supplementation being infused through a percutaneous endoscopic gastrostomy as he or she lay on a specialized bed.

Channeling Money

Business models, having more to do with money than health care, are created around gizmos. A prostate irradiation therapy known as intensity-modulated radiation therapy is being marketed with great potential to enhance practice revenue for urologists, who reportedly are reimbursed at \$47 000

per patient treated.¹⁵ Thousands of physicians have purchased, are using, and bill profitably for a handheld device that checks patients for nerve disease.¹⁶ Although evidence of benefit to the patient is uncertain, profits to practitioners and corporate vendors for successful gizmos such as these can be substantial.¹⁷

Harms From Gizmo Idolatry

Gizmo idolatry can cause harm to patients, threaten the advancement of medical science and health systems, and erode professionalism. Early widespread dissemination of a gizmo may jeopardize perceptions of equipoise and delay appropriate evaluation, exposing patients to potentially poor medical practice. For example, in 2006, a clinical trial concluded that use of Swan-Ganz catheters "did not improve survival or organ function but was associated with more complications than central venous catheter-guided therapy."¹⁸ Use of pulmonary artery catheters is now decreasing, but for 2 decades their widespread use, with attendant costs and harms, continued without evidence of benefit. Knee arthroscopy for osteoarthritis, direct brain injection of embryonic neurons for Parkinson disease, transmyocardial laser revascularization for heart failure, and nerve cryoablation for pain control after hernia repair have each failed to improve outcomes compared with placebo or sham surgery.¹⁹

Incentives among the principal stakeholders in the health system—patients, physicians, payers, policy makers, and industry—are misaligned. Health systems, policy makers, and insurers with legitimate interests in controlling utilization of unproven, expensive technology experience tremendous pressure to pay for gizmos. For individual patients, adopting more expensive gizmos such as liquid-based cervical cytology in favor of conventional Papanicolaou smear risks makes care less affordable.²⁰ Physicians offered the choice between poorly reimbursed, careful, painstaking, uneventful diligence or a well-reimbursed exploit may be unable to overcome the fundamental injustice and may behave in ways that are not in the patients' best interests. Vendors seek profits, but harm to medicine, as a public trust, is real.

Gizmo Idolatry in an Aging Society

The baby boom generation will soon age into frailty. Disability in advanced age is often the sum effect of multiple chronic conditions. For many individual conditions, gizmos are available. Piecemeal attempts to correct individual components of a global process, coupled with gizmo idolatry, could greatly expand the already widespread use of unproven technologies. Assuming that demand for health care services increases as baby boomers age, that technology continues to develop rapidly, and that the Medicare budget remains constrained, payments for technologies (and medications) will compete directly with payments for the uneventful diligence of clinicians.

What to Do?

In the medical marketplace, some combination of avarice, hucksterism, credulity, genuine need, and gizmo idolatry impart considerable momentum to the early and unconsidered use of many unproven technologies. A multitiered strategy will be required to combat this phenomenon. Recognition of gizmo idolatry is a critical first step in educating consumers, both clinicians and patients, to be circumspect rather than enthusiastic and to seek evidence about the effectiveness of any medical technology. Tort reform may help reduce defensive medicine–induced gizmo idolatry. Wennberg et al²¹ have proposed reforms to the Medicare system to reduce, among other things, the use of supply sensitive services, sometimes a manifestation of gizmo idolatry. Their proposal includes (1) promoting health care organizational structures that foster effective care delivery, (2) detailed strategies to improve the quality of patient-physician decisions regarding treatments in which patient preference should play a role, (3) the promotion of more conservative practice styles, and (4) the establishment of Comprehensive Centers for Medical Excellence to implement these changes.²¹

Conclusion

Gizmo idolatry describes the willingness to accept, in fact to prefer, unproven, technologically oriented medical measures. Several forces contribute to and encourage this tendency. Great burdens may result. Clinicians, patients, payers, and policy makers should be mindful of the urge to use gizmos. Purveyors should proceed responsibly, limiting promotional efforts until data about meaningful benefit to patients are developed. Payers should be stringent in their decisions to cover expensive and unproven treatments. Clinicians and patients should resist the clamor for the new and fancy. Finally, all stakeholders should encourage and reward diligent bedside care for all who need it.

Financial Disclosures: None reported.

Funding/Support: This article was sponsored by the Institute for Incentives in Health Care.

Role of the Sponsor: The sponsor had no role in the preparation, review, or approval of the manuscript.

Additional Contributions: Deborah Statom (Johns Hopkins Bayview Medical Center, Baltimore, Maryland) provided assistance with manuscript preparation. Ms Statom did not receive any compensation for her contribution.

REFERENCES

1. Nobelprize.org. The Nobel Prize in Physiology or Medicine 1949. http://nobelprize.org/nobel_prizes/medicine/laureates/1949/. Accessed February 29, 2008.
2. Stadtmauer EA, O'Neill A, Goldstein LJ, et al. Conventional-dose chemotherapy compared with high-dose chemotherapy plus autologous hematopoietic stem-cell transplantation for metastatic breast cancer: Philadelphia Bone Marrow Transplant Group. *N Engl J Med*. 2000;342(15):1069-1076.
3. DiSalvo CR. Essay: worshipping at the altar of technique: manic aggressive medicine and law. *Villanova Law Rev*. 1995;40(5):1365-1393.
4. Grimes DA. Technology follies: the uncritical acceptance of medical innovation. *JAMA*. 1993;269(23):3030-3033.
5. Fisher ES, Wennberg DE, Stukel TA, Gottlieb DJ, Lucas FL, Pinder EL. The implications of regional variations in Medicare spending, part 1: the content, quality, and accessibility of care. *Ann Intern Med*. 2003;138(4):273-287.
6. Hillis LD, Lange RA. Myocardial infarction and the open-artery hypothesis. *N Engl J Med*. 2006;355(23):2475-2477.
7. Little WC, Constantinescu M, Applegate RJ, et al. Can coronary angiography predict the site of a subsequent myocardial infarction in patients with mild-to-moderate coronary artery disease? *Circulation*. 1988;78(5 pt 1):1157-1166.
8. Spandorfer PR, Alessandrini EA, Joffe MD, Localio R, Shaw KN. Oral versus intravenous rehydration of moderately dehydrated children: a randomized, controlled trial. *Pediatrics*. 2005;115(2):295-301.
9. Cates CJ, Crilly JA, Rowe BH. Holding chambers (spacers) versus nebulisers for beta-agonist treatment of acute asthma. *Cochrane Database Syst Rev*. 2006;(2):CD000052.
10. Veblen T. *The Theory of the Leisure Class*. Gloucester, England: Dodo Press; 2005.
11. Poldermans D, Bax JJ, Schouten O, et al. Should major vascular surgery be delayed because of preoperative cardiac testing in intermediate-risk patients receiving beta-blocker therapy with tight heart rate control? *J Am Coll Cardiol*. 2006;48(5):964-969.
12. Levinson W, Roter DL, Mullooly JP, Dull VT, Frankel RM. Physician-patient communication: the relationship with malpractice claims among primary care physicians and surgeons. *JAMA*. 1997;277(7):553-559.
13. Cullum N, McInnes E, Bell-Syer SE, Legood R. Support surfaces for pressure ulcer prevention. *Cochrane Database Syst Rev*. 2004;(3):CD001735.
14. Finucane TE, Christmas C, Travis K. Tube feeding in patients with advanced dementia: a review of the evidence. *JAMA*. 1999;282(14):1365-1370.
15. Saul S. Profit and questions as doctors offer prostate cancer therapy. *New York Times*. December 1, 2006:A1, C7.
16. Abelson R. New nerve test, a moneymaker, divides doctors. *New York Times*. October 20, 2006:A1, C6.
17. Garber AM. The price of growth in the medical-device industry. *N Engl J Med*. 2006;355(4):337-339.
18. Wheeler AP, Bernard GR, Thompson BT, et al; National Heart, Lung, and Blood Institute Acute Respiratory Distress Syndrome (ARDS) Clinical Trials Network. Pulmonary-artery versus central venous catheter to guide treatment of acute lung injury. *N Engl J Med*. 2006;354(21):2213-2224.
19. Flum DR. Interpreting surgical trials with subjective outcomes: avoiding UNSPORTsmanlike conduct. *JAMA*. 2006;296(20):2483-2485.
20. Arbyn M, Bergeron C, Klinkhamer P, Martin-Hirsch P, Siebers AG, Bulten J. Liquid compared with conventional cervical cytology: a systematic review and meta-analysis. *Obstet Gynecol*. 2008;111(1):167-177.
21. Wennberg JE, Fisher ES, Skinner JS. Geography and the debate over Medicare reform. *Health Aff (Millwood)*. 2002;(suppl Web exclusives):W96-W114.