An Online Medical Database Is Reducing Diagnostic Errors

BY REBECCA WEINTRAUB, YANNIS K. VALTIS, AND PETER BONIS

Diagnostic errors burden providers, payers, and patients around the world. They lead to avoidable illness, suffering, and poor health outcomes and increase costs of care significantly. Access to evidence-based medical content at the point of care that answers clinical questions and ensures accuracy in diagnosis can reduce diagnostic errors and improve outcomes. Our organizations are involved in the efforts to expand global access. We encourage others to join us in this effort and offer three recommendations for accelerating this drive.

Forty-four thousand Americans die each year as a result of preventable medical errors, and $17 billion is spent on that erroneous care. This September, the Institute of Medicine reported that most patients in the United States experience a diagnostic error in their lifetime. Many in the United States have argued that diagnostic errors have been neglected due to the belief that health systems are not measuring errors and are disinclined to finding systemic solutions.

Despite the massive scale of preventable, costly medical errors in the United States, the problem is dwarfed by their prevalence in resource-constrained settings. Given that most developing countries do not record medical errors, the global magnitude of the problem is not well documented. The data that is available, such as a 2012 study of over 15,000 patient records from 26 African and Middle Eastern hospitals, produce alarming results: 6.8% of all hospitalized patients experienced a preventable medical error, and more than one-third of them died as a result. Therapeutic and diagnostic errors accounted for the vast majority of all events.

A unique driver of diagnostic errors where physicians and nurses are scarce is the lack of access to clinical information. Due to the limited number of postgraduate medical programs and lack of trained specialists, health workers are often required to practice beyond their scope of training. For example, Rwanda had, until recently, a total of 15 anesthesiologists, 25 obstetricians and zero neurologists serving a population of 11 million people. Indeed, the 2012 study discussed above identified "inadequate training or supervision of clinical staff" as a major contributor to diagnostic errors in Africa and the Middle East.

Promoting access to point-of-care medical content has great potential to reduce errors, thereby reducing costs and improving outcomes. Researchers at the Mayo Clinic showed that U.S. physicians who used UpToDate, the leading provider of current, evidence-based clinical content and expert-authored recommendations for diagnosis and treatment, scored better on certification exams.

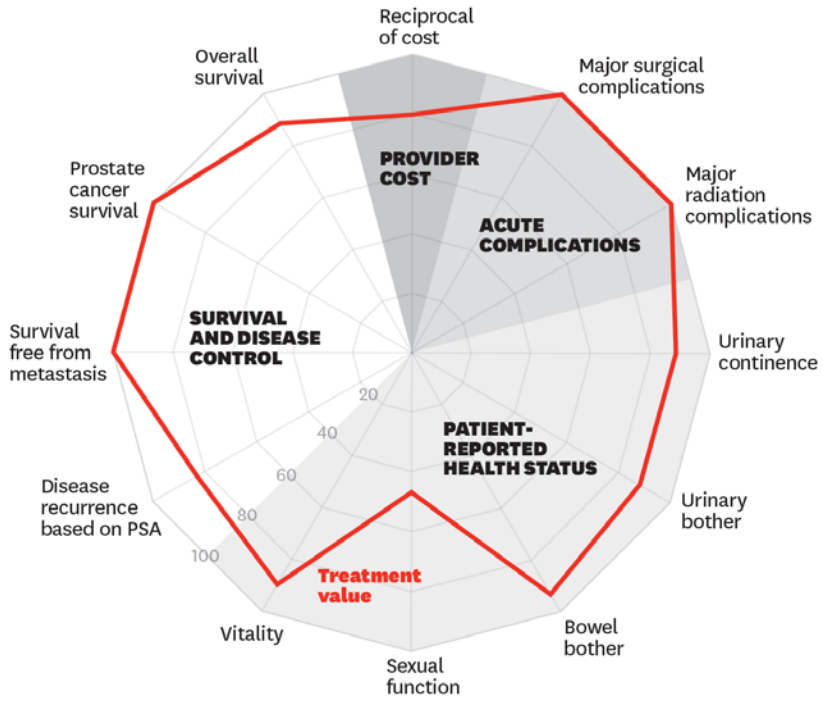
Studies in the United States have also demonstrated that use of UpToDate is associated with lower risk-adjusted mortality rates and lengths of stay at the hospital — i.e., lower costs and better outcomes. The impact was greater in smaller, non-teaching hospitals.

UpToDate, which is part of Wolters Kluwer, provides concise and actionable recommendations for how to diagnose and treat a vast spectrum of conditions, is authored by world experts in all clinical fields, and is constantly updated. Despite its benefits, its integration into clinical practice in some regions of the world has lagged, owing partly to subscription fees.

The Global Health Delivery (GHD) Project at Harvard University and Wolters Kluwer launched a partnership in 2009 to donate

The Outcomes and Cost of Brachytherapy Treatment for Prostate Cancer

A score of 100 represents the ideal performance.



SOURCE INTERNATIONAL CONSORTIUM FOR HEALTH OUTCOMES MEASUREMENT; MD ANDERSON CANCER CENTER

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subscriptions to UpToDate to clinicians in resource-limited settings around the world. (Wolters Kluwers donates the subscriptions, and GHD selects the recipients and monitors their usage.) To date, we have awarded subscriptions to over 1,000 health care institutions in 45 countries. The large majority of log-ins come from sub-Saharan Africa, and 61% of the users utilize the service at least weekly via a computer or mobile device.

There is ongoing debate regarding the quality of open-source medical content. For example, only 1% of medical articles on Wikipedia have passed review, yet it is widely accessed, with 5 billion page views per year. Other attempts such as Medpedia, WikEerg.ca, and Nupedia have been insufficient, due to low quality, lack of breadth, and difficulty attracting readership.

Conversely, UpToDate is a reliable source for medical content and has had substantial impact on patient health outcomes and costs. Reports from subscribers indicate a dramatic improvement in health workers' ability to construct an appropriately broad differential diagnosis, apply validated criteria, and arrive at a correct assessment.

In one instance, physicians consulted UpToDate on a patient with suspected Acute Rheumatic Fever and applied the Jones Criteria to establish that reactive arthritis secondary to a Shigella infection was more likely. This saved the patient a year of prophylactic antibiotics. In another case, a patient presenting with jaundice and hepatosplenomegaly was treated incorrectly for an amoebic abscess. After consulting UpToDate, physicians identified the cause of her problems as autoimmune hepatitis and treated the patient with steroids. She immediately improved.

As Internet connectivity improves around the world, barriers to online medical content decrease, its widespread integration into practice becomes more feasible. To fully exploit the value of continuously-updated, evidence-based resources, we recommend the following:

1. Introduction of such resources early in the clinical training of physicians and nurses. Habituating the new generation of health care professionals to consult the evidence base is key to generate better outcomes for patients. Recent trainees need to see the benefits and become role models in consuming current knowledge and practicing evidence-based medicine. (To demonstrate this, we are currently implementing a study of the free provision of UpToDate to all students and faculty in four African medical universities.)

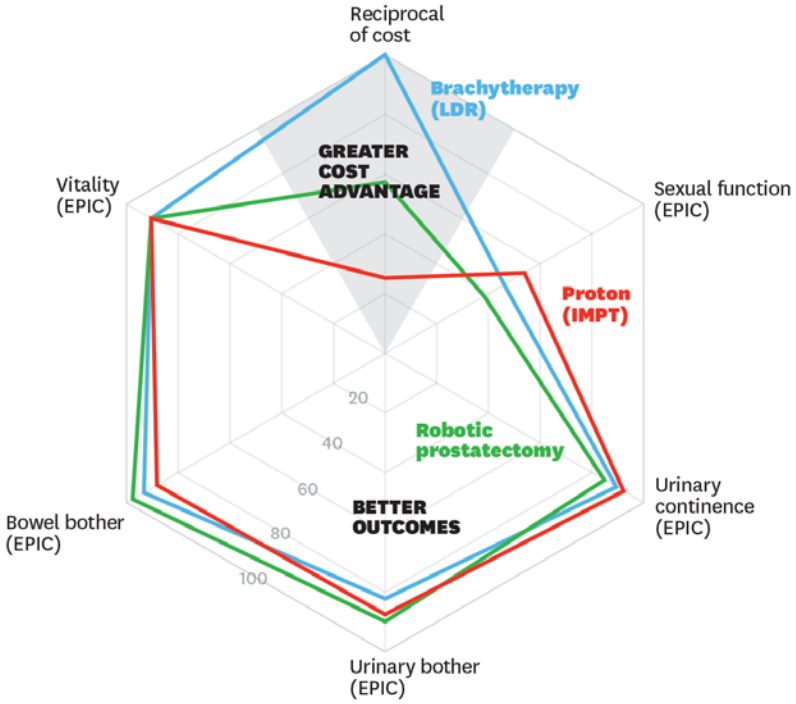
2. Systemic change in the diagnostic workflow to create time for the consultation of current, high-quality evidence. A recent discussion within the Global Health Delivery online forum generated hundreds of responses from health workers across the world, highlighting the difficulties of choosing the right diagnostic for the right patient in limited time. Protocols can remind clinicians to refer to the evidence in the midst of diagnosing and clinical reasoning

3. New investments to distribute evidence-based clinical resources. Previous attempts to open source clinical information have been insufficient, due to low quality and limited breadth of data. An opportunity exists for ministers of health, minsters of finance, multilateral donors, professional medical organizations, and the private sector to reduce diagnostic errors by investing in the distribution of high-quality clinical content.

In April, the chief medical officer of the Liberian Ministry of Health wrote in The New York Times that the inability to freely access medical literature on Ebola in Liberia harmed his country's ability to respond to the epidemic quickly and effectively. Evidence-based resources on Ebola were available to 40 GHD UpToDate subscribers in Liberia prior to the outbreak of the epidemic. This was grossly insufficient. Our aspiration is that prior to the next health emergency, the entire global workforce will have comprehensive and updated evidence to prevent and contain the threat.

Comparing the Value of Three Alternative Prostate Cancer Treatments

A score of 100 represents the ideal performance.



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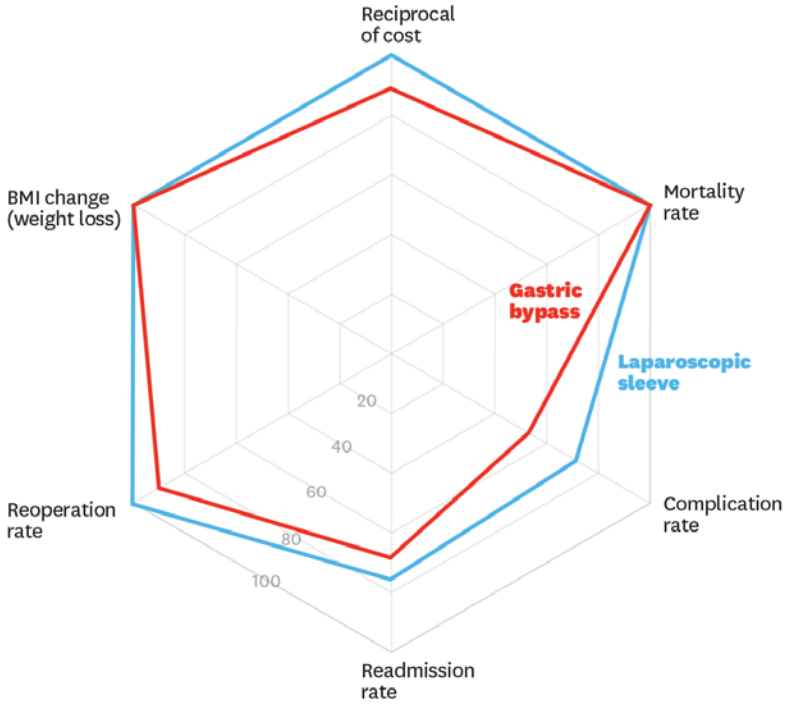
Comparing the Value of Alternative Bariatric Surgery Procedures Performed at One Hospital

A score of 100 represents the ideal performance.



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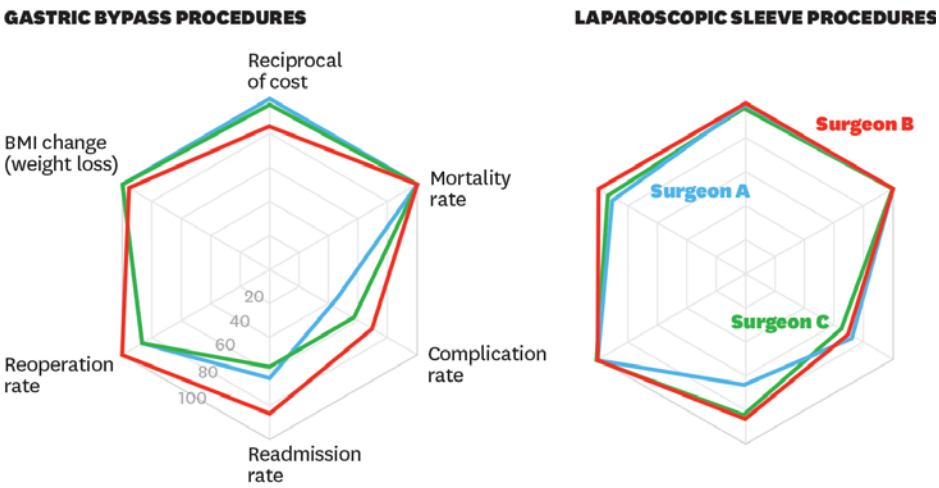
Comparing the Value Delivered by Three Surgeons for Two Alternative Bariatric Procedures

A score of 100 represents the ideal performance.



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Access to high-quality, point-of-care medical content is instrumental in preventing diagnostic errors and curbing the spread of disease. That access can and should be expanded more quickly. Populations throughout the world depend on it.

SPONSOR'S PERSPECTIVE

Improving Outcomes by Erasing the "Integration Deficit"

How the Application of Technology and Use of Data Will Lead to Gains in Patient Outcomes While Reducing Costs

We live in a world where our personal devices—whether they're in our pocket, car or home—can seamlessly share real-time data with each other. But the same cannot be said for a much more important area of our lives—healthcare. That's because many of the systems that record and store healthcare data across the care continuum are not integrated. Erasing this so-called integration deficit is a critical next step in healthcare's evolution as we transition to value-based healthcare.

While many stakeholders see the potential for improved collaboration, the misaligned incentives of many healthcare systems make the prospects for integration a significant challenge. Repeated tests, recurring readmissions, and an incomplete picture of a patient's overall health are often the result. By working together to manage patient care holistically, the healthcare industry can improve clinical and financial outcomes.

So if the lack of integration is the problem, how do we start working toward a solution? More connected medical technologies—implanted and otherwise—can and should play a crucial role, as will better use of data to help healthcare professionals see a broader view of their patients. Today, many of Medtronic's technologies are actively generating data, and we are working with the global healthcare community to take our technology, services, and insights and fashion them into solutions that either augment the delivery of care through better patient care management or improve overall system efficiency.

In the spirit of progress and partnership, our work includes:

- Utilizing insulin pump technology, sensors and mobile applications to better manage patients outside of the hospital setting in the Netherlands,
- Combining implanted heart failure technologies, diagnostic sensors, and nursing support to keep heart failure patients out of VA hospitals,
- Collaborating with IBM Watson to identify better care management for diabetes patients by using the patient's own data,
- Working with hospitals to allow quicker patient discharges by giving doctors and nurses the ability to monitor patient care and progress remotely,
- Partnering with hospitals to manage their cath labs for better patient throughput and outcomes, and
- Working on-site at hospitals to drive improvements in efficiency, quality, clinical outcomes, and patient experience, all within an outcomes-based payment model.

As we've seen in our efforts, the successful integration of patient care will require collaboration between providers, suppliers, physicians and payers. At Medtronic, we believe we have an important role to play in the integration of healthcare. There's an opportunity to harness the data and insights our technologies produce to create a more integrated, patient-centered healthcare system—one that ultimately is set up to achieve and reward the long-term outcomes that are central to a value-based healthcare system.

Learn more about our perspective on integrating care and value-based healthcare here.

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