

# 10 Minutes

## on medical innovation



January 2012

### *Smaller, faster, cheaper: The future of medical technology*

#### Highlights

Leadership in medical technology innovation is slowly moving from developed to developing countries.

Faster, smaller, cheaper technological advances portend the future of medical technology.

Medical technologies developed within the continuum of care that bring a comprehensive approach to disease management have the potential to revolutionize medical innovation.

To remain competitive in the world market, US companies must radically rethink their “bigger is better” approach to innovation.

The US is the dominant player in the \$350 billion global medical device industry.<sup>1</sup> But emerging economies—in particular, China, India, and Brazil—are capturing a growing market share.

Under the current model in the developed world, once a new product is introduced, companies crowd the market with “add-on” innovations to the product that often increase costs with only marginal benefits to patients. This has led insurers and other payers to view innovation as the problem rather than the solution.

In contrast, innovators in emerging markets are creating devices that both improve patient outcomes and cut costs. In doing so, they’re creating new business models and processes that require adjustments for US businesses that want to retain leadership and prosper in emerging markets.

#### Why is the traditional US approach to new product development no longer effective?

1. Now that employers, the government, and payers in the US are increasingly shifting the costs of medical devices to patients, they’re no longer as likely to demand the latest and “best”—read: most expensive—technologies. Consumers are weighing their healthcare options more carefully, driving the market’s appetite for more value at lower cost.
2. Meanwhile, the established model has rewarded incremental, low-value-adding technological advances. Many successful industry leaders have asked, “How can I differentiate my products to add a pricing premium?” More innovative leaders now ask, “What can I take away to charge the same or less?”
3. In developing countries, care has to be delivered to both densely populated cities and far-flung rural locations with limited resources. Smaller, faster, connected, and affordable devices that enable delivery of care anywhere at lower costs are the answer. Developing nations have become the leading markets for these more efficient technologies, and major global firms are establishing significant physical presences in these markets.

<sup>1</sup> Medical Technology Innovation Scorecard: The race for global leadership,” PwC, January 2011.

## At a glance

### Five pillars of medical technology innovation favour growth in China, India, and Brazil in coming years

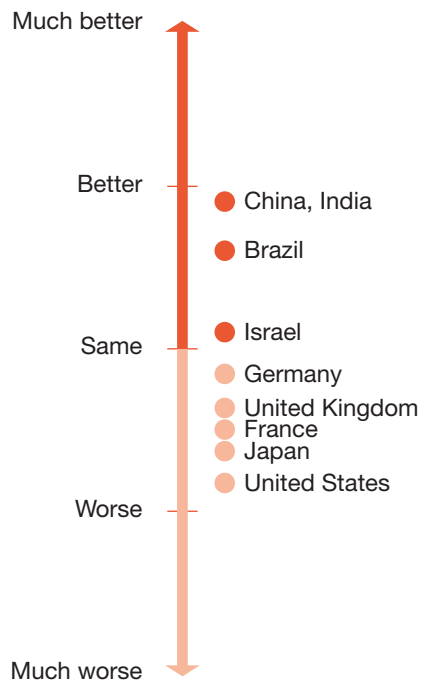
System-Oriented and Valued-based Incentives	Global networks of academic medical centers	Competing regulatory systems	Individualized solutions and price-sensitive customers	Global financial networks
<p>Fiscal and financial needs compelling payers to press providers for greater value, exemplified by value-based reimbursement models</p> <p>Focus shifting from silo-based to integrated healthcare systems</p>	<p>Emerging markets investing in their own academic medical centers</p> <p>US and European institutions seeking partnerships with research centers in diverse countries</p>	<p>Greater ease and cost-effectiveness of regulatory approvals occurring in other nations</p> <p>Companies seeking European, Asian, or Australian approvals in advance of US review</p>	<p>Personalized medicine and cost-shifting measures driving individualization of healthcare and consumer-centric focus</p> <p>Emerging markets creating “frugal and lean” innovation, which is redesigning product and distribution processes</p>	<p>US venture capitalists partnering with overseas counterparts and seeking co-investment opportunities</p> <p>US venture capital firms opening offices abroad in Israel, India, China and Europe</p>

# 01

## Medical technology innovation is moving offshore

### Future expected attractiveness of the commercialization opportunity

In 2015, do you believe that the attractiveness of the commercialization opportunity will become much worse, worse, same, better, or much better?



Source: PwC survey

During the past two decades, more than 1 billion new consumers entered the world market, mostly in emerging economies. Thus, the chief consumers of the next generation of medical technology are located in the developing world. These consumers will demand the application of practical, innovative technologies to meet the needs of populations that have fewer resources and are often spread out over vast geographies.

### The opportunity is huge

China’s and India’s massive populations alone represent huge new consumer bases. While the growth rate of medical technology in the US stalls, a PwC study on innovation predicts that the Chinese medical device market will expand 15 percent annually during the next five years.<sup>2</sup> India’s market is expected to expand 23 percent each year. China and India also show the most rapid rates of growth in triadic<sup>3</sup> patent families, with China growing 34 percent per year, and India 10 percent per year.

Although the US invests more in R&D than any other country, US investment in R&D as a percentage of GDP is declining. China’s R&D budget, on the other hand, is increasing both absolutely and relatively. By 2020, China’s R&D expenditure as a percentage of its GDP will reach US 2010 levels. China has also

eclipsed all nations except the US in terms of its number of research publications, and the quality of China’s research institutions is improving. As a result, the US expects China to become a global competitor for talent, resources, and output.

### US companies will need to adjust

Global medical device companies are pursuing technologies that will challenge the “more is better” mantra entrenched in so many US businesses. The US medical technology industry cannot assume that the traditional innovation model that has enriched companies in the US and Europe will apply in these new markets.

Many US companies have become comfortable operating in a system in which top-of-the-line technologies are reimbursed at premium prices and patients are accustomed to asking for—and receiving—“the best,” regardless of price. Such companies lack motivation to innovate technologies that are cheaper and less sophisticated than what came before. Meanwhile, emerging countries with little history of innovation and limited resources are innovating in new, radical ways.

2 Medical Technology Innovation Scorecard: The race for global leadership,” PwC, January 2011.

3 A series of corresponding patents filed in the US, Europe, and Japan for the same invention.

## 02

## The future is smaller, faster, and cheaper

Under the old model, US companies developed innovative products and medical devices in the home market and then exported them to other countries. While the US typically found a market for its innovations in developed countries, many devices remained cost-prohibitive or simply impractical for developing countries.

Those fast-growing consumer markets are where US-based companies are looking to grow. Most of the large US medical technology companies are establishing local innovation centres to identify and address regional needs.

### Follow the money

As investment opportunities move offshore, more US-based venture capitalists and private equity investors have begun to open local offices overseas, partner with counterparts outside the country, seek co-investment opportunities, and identify target investee companies abroad. US investors are putting venture capital and private equity into companies in China, India, and Brazil to build some of the world's most entrepreneurial cultures.

State governments are also investing. The governments of India and China are aggressively promoting venture funding and providing capital to early-stage firms within their borders.

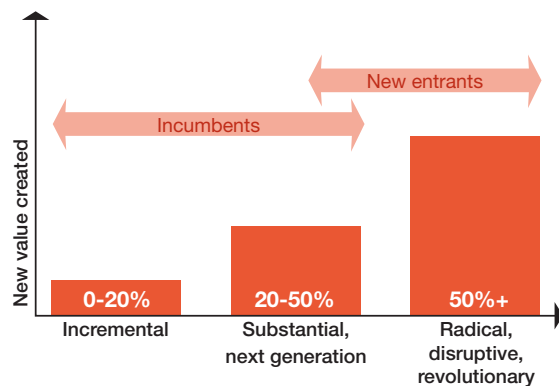
### Innovating at the source

Often, cost constraints in innovation centers in developing countries lead them to develop “frugal innovations,” solutions that deliver superior value at a fraction of the costs typically seen in developed countries. These products are often usable in other markets, including developed markets.

One example is an ultrasound monitor produced by a large international medical device manufacturer. The monitor's predecessor, a considerably larger device with a price tag in excess of \$100,000, found a market in developed countries. But its weight and cost made it unsuitable for emerging markets. The new monitor weighs about ten pounds, costs about \$10,000, and has been widely adopted in the developing world. This “reverse innovation” has also permeated US markets, threatening the viability of more expensive devices. Another frugal innovation is a recently introduced handheld ultrasound device weighing less than a pound and costing about \$8,000. If the company that created the device can develop a successful business model to distribute and support it, it has the potential to revolutionise the ultrasound market worldwide.

In addition, companies are making use of digital, connected technologies to extend care to large populations with little income or access to hospitals and physicians. For example, the laboratory of a large medical device manufacturer in Bangalore, India, has created a handheld electrocardiogram (EKG) device with just four buttons that retails for less than half the cost of a full-scale EKG device. The company is also developing a mini CT scanner, that, although less effective than the large scanners common in the US, is still superior to imported second-hand machines or no machines at all.

### Classes of innovation



Source: PwC survey

# 03

## *Integrating care across the healthcare system*

### **New technologies developed within the continuum of care**

Historically, physicians have stayed within their own clinical spheres of practice. Medical technologies have similarly been narrowly focused on one single aspect of a disease or healthcare problem. Unfortunately, diseases and their required treatment do not always stay within one discipline or organ. **New technologies are being developed to work within an integrated continuum of care—a sharp departure from the silo-based applications of traditional medical technology.**

Integrating care cuts costs and improves outcomes. When physicians do not communicate, tests are duplicated, time is wasted, and money is lost. The US public and private sectors are embracing new healthcare delivery models such as “medical homes” and “accountable care organizations” in an effort to coordinate care and eliminate waste nationwide.

New medical device technologies meet the challenges of uncoordinated, disjointed care head-on. They hold the promise of enabling a network of physicians to use mobile devices to monitor patients and coordinate their care across disciplines and across the healthcare system. For example, Ideal Life, a multinational company, has joined forces with China Unicom to conduct a remote patient monitoring pilot of 100,000 Chinese citizens to better coordinate their care—the largest program of its kind. This model of care strikes at the many ills of the current system all at once: redundant sometimes harmful procedures due to uncoordinated care, costly processes, slow diagnoses and treatments, lack of sustained disease management, etc.

### **End-to-end disease treatment solutions**

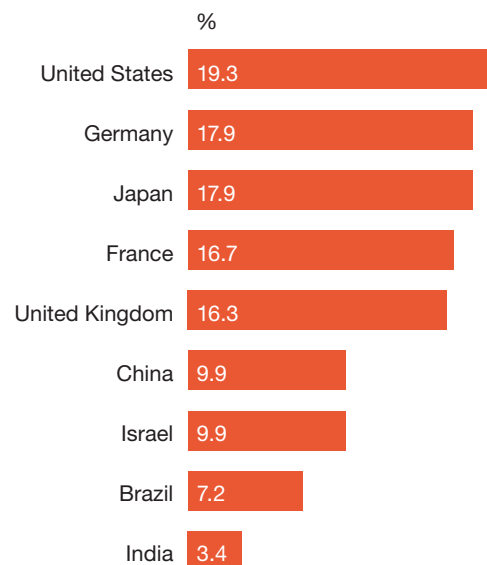
Truly innovative companies are thinking in terms of “owning” a disease. Companies own a disease when they provide a comprehensive solution to a healthcare problem across the care continuum. For example, a company that seeks to “own” asthma might go beyond manufacturing pharmaceuticals to address the entire experience of the disease. They might manufacture inhalers, create disease management mobile apps, offer diagnostic testing, and market personalized, electronically-based patient education materials and related services.

Companies that embrace this new paradigm find that they are expanding the way they think about innovation. Their very business models change as they take into account not only their end products, but also their processes, services, distribution, and the relationships their companies forge with the consumers and physicians who use their products.

# 04

## Bigger isn't always better

Government expenditure on health as % of total government expenditure



Some medical device business leaders in the developed world have grown concerned that the predominant practice of adding new features to established products designed to command higher prices has led to a proliferation of **mindless novelty**. With an eye on the medical technology developments in the developing world, some business heads are realizing that they need to focus more on **mindful innovation**—in which technology is a thoughtful, cost-effective response to identified needs. For consumers and employers—who bear a significant burden of the healthcare costs in the US—the global medical technology race has the potential to bring real, novel solutions to identified problems and transform the practice of medicine.

### Money doesn't always buy value

In the US, reimbursement for medical technology is typically generous, and consumers rarely see the actual price tag. But the current rate of US healthcare spending may not hold. The US spends a larger percentage of its GDP and more per capita on healthcare than any other country. In 2009, the US spent a record 17.3 percent of its GDP—\$2.5 trillion—on healthcare—an average of \$8,050 per person. That's nearly twice as much as what Japan spends; 50 percent more than what France, Germany, and the UK spend individually; and 15 times more than what China spends.

In the US system, innovations that cut costs and enhance value threaten the revenues of

stakeholders, who have become accustomed to their companies being reimbursed for pricey technologies of even limited therapeutic value. In developing countries, where most payments are made out-of-pocket by consumers, patients place a high premium on value when making healthcare purchasing decisions. When medical technology firms enter these markets, they are challenged to create simpler and more functional devices that achieve equal or better outcomes at lower prices.

The trend can be troublesome for US companies that have grown to enjoy a wealthy consumer base for spare-no-expense technologies. When they enter another country such as India, they realize that just as they cannot sell a device made for the US market there, neither can they limit a specific device to markets of their choosing. For example, a company might create in India a device that performs the same task as a device in the US market, but the US device is many times larger and many times more expensive.

Clearly, to retain leadership in the home market and prosper in the fast-growing markets outside, US companies will have to adjust to new innovation paradigms and new business models.

Source: World Health Organization, based on 2006 data, which was the latest available

## Upcoming 10Minutes topics

### **CEO Agenda 2012**

Despite uncertainties – whether economic, regulatory or other – CEOs are taking deliberate steps to stretch in markets they believe are most important for their future. 10Minutes distills the findings from PwC’s survey of more than 1,250 CEOs around the world as the CEOs’ agenda for 2012.

### **Managing water risks**

Businesses have to compete for fresh water with a burgeoning global population that is consuming more food and energy; both are inextricably linked to water. Missteps in managing water can lead to political and legal snafus that halt production in far-flung global operations. 10Minutes discusses how companies can find creative solutions to managing water risks by taking the long view.

### **Growing by understanding your customer better**

Is your organization using the new and emerging tools to understand your customers better? While markets reward companies that understand their customers best, long-held assumptions about how customers behave can steer companies off-track;

flawed intelligence can lead to ineffective marketing decisions and missed growth opportunities. This 10Minutes focuses on opportunities to use emerging tools and disciplines to better understand customers— particularly relevant now, when companies are making big bets on customer-centric growth strategies.

### **Next generation business intelligence**

The business information companies collect has changed radically in recent years, with more unstructured data available through the Web, email, blogs and other multimedia sources. Tried and true methods for managing traditional data are no longer up to the task. 10Minutes explores how leading companies are treating different types of data differently, to gain greater insight into their operations, customers, and performance.

## ***How PwC can help***

**To have a deeper discussion about medical innovation, please contact:**

David Levy, MD  
Global Healthcare Leader  
david.l.levy@us.pwc.com  
+1.646.471.1070

Christopher Wasden  
Global Healthcare Innovation Leader  
christopher.wasden@us.pwc.com  
+1.646.471.6090

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