Discover some health care innovations that are coming to the U.S. from developing nations.

The realization that the American health care system must simultaneously decrease per-capita cost and increase quality has created the opportunity for the United States to learn from low- and middle-income countries.

"Reverse innovation" describes the process whereby an inexpensive innovation is used first in countries with limited infrastructure and resources and then spreads to industrialized nations like the United States.

The traditional model of innovation has involved the creation of high-end products by companies in industrialized nations and the spread of these products to the developing world by adapting them to function in low- and middle-income countries.

Reverse innovation involves the United States borrowing new ideas and products designed for less wealthy countries in order to deliver health care more efficiently. They also lack 20th century infrastructure and so they have leapfrogged to newer technologies such as mobile phones or solar energy instead of landlines and petroleum-based energy sources.

Service ecosystems develop in these countries because entrepreneurs have to rely on others for help by creating new partnerships like video game cafés where gamers test new products.

Emerging markets require products that work in rugged conditions, and customers in poor countries have few product choices, providing market openings for add-ons that update and extend the lives of existing merchandise. Intermediaries such as venture capitalists, universities and regulators are also often absent in poorer countries.

Pacemakers in the cloud

An example of how an absence of intermediaries can spur innovation is the Medtronic approach to chronic disease management in nations without adequate medical school capacity to train specialists in heart disease. Sixty-nine percent of deaths in such nations are due to chronic disease, but the building of medical training programs takes decades.

Medtronic designed a low-cost, pill-sized pacemaker inside a stent that can be put into the heart instead of the invasive intercadiac leads used in the U.S. to electrically synchronize the heart. Remote sensors in the pill-sized pacemaker transmit signals via any smartphone to a cloud-computing infrastructure.

Although this new technology was developed for India, which has 1 billion citizens but only 100 electrophysiologists, Medtronic intends to market this low-cost pacemaker in the United States and Europe.

General Electric has embraced reverse technology as a way to survive in an era where economic growth is slowed in the United States and Europe, but growing rapidly in India and China.

GE developed a $1,000 handheld electrocardiogram device for rural India and a $15,000 PC-based portable
ultrasound machine for rural China. These devices are much more affordable and rugged than their American counterparts, and they are now being sold in the United States.¹

General Electric has also partnered with Embrace to distribute a low-tech infant warming device that consists of a sleeping bag, a sealed pouch of wax and a heater. In contrast to traditional incubators that cost $20,000, this new device costs $200 and will help warm the 20 million low-birth weight and premature babies born around the world.⁴

OneBreath is a rugged, low-cost ventilator that was designed for use in developing countries that experience large influenza pandemics. By measuring and controlling airflow with software rather than hardware, OneBreath was able to reduce the cost of ventilators from $40,000 (with $180 replacement tubes) to $800 (with 50-cent replacement tubes).⁵

Procter & Gamble is now marketing a honey-based cold remedy created for Mexico in the United States and Europe, and the Center for International Rehabilitation has developed low-cost prosthetic and orthotic devices that can be used in rural areas where highly trained specialists are not available.⁶

JaipurKnee has developed a $20 high-performance prosthetic knee joint for amputees in India who cannot afford the $100,000 titanium knee joints routinely used in the United States.⁵

The Stanford University BioDesign Program has developed a $20 device for delivering fluids or intravenous drugs into the bone marrow when vascular access is unavailable. The device was invented in India, but it could be used in rural America as well.⁷

**Medical devices invented in low-income countries headed to U.S.**

Cost constraints

The United States is now faced with the challenge of decreasing per-capita cost and increasing quality. Many believe that the high cost of American health care is the major reason that the United States is facing a large federal deficit problem that is hampering the ability of American companies to compete in a global economy.

Some believe that the high cost of American medicine also is a major factor in causing and prolonging the current recession. The high cost of health insurance is a problem for employers who then do not give salary increases to their employees. The employees borrow money in order to continue to support their lifestyle.

Stagnant employee wages have been cited as a reason for Americans defaulting on their mortgages and car payments, which resulted in the current recession that started in 2008.

American health care organizations are facing decreased revenues due to decreased volume of hospitalizations and office visits by unemployed workers; Medicare cuts contained in the Affordable Care Act, and cuts resulting from the budget deficit ceiling compromise passed by Congress that will result in either a $1.5 trillion or a $1.2 trillion decrease in federal spending.
At a time when it is clear that health care providers will be receiving less revenue, it would be wise to adopt inexpensive innovations that have been created for less-developed countries. Reverse innovation may be one way that American medicine can decrease per-capita costs and increase quality at the same time.

References:
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Five Best Books on Innovation, Reverse and Otherwise
