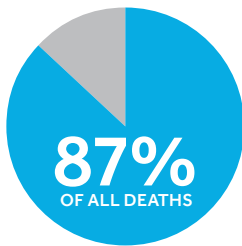


In the past century, the leading causes of death — infectious diseases — declined dramatically thanks to the development of vaccines, improved sanitation, greater public health awareness, and modern medicine. Overall mortality from things like the flu and pneumonia decreased by more than 50 percent, while life expectancy has risen by 30 years.<sup>1</sup>



*Chronic diseases are projected to account for 87 percent of all deaths in high-income countries.<sup>2</sup>*

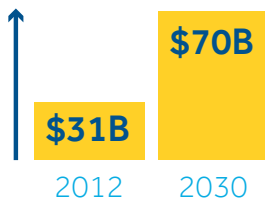
However, this shift brings new challenges. Chronic diseases — such as heart disease, stroke, cancer, chronic respiratory diseases and diabetes — are projected to account for 87 percent of all deaths in high-income countries.<sup>2</sup> As health systems are designed around treating acute needs rather than long-term interactions with patients, these chronic conditions continue to rise. We have to find ways to work together as an industry to find new ways to address these conditions.

At Medtronic, we are committed to accelerating the development of meaningful innovations for patients with chronic diseases — innovations that add real value in better patient outcomes at appropriate costs, lead to enhanced quality of life, and can be validated by clinical and economic evidence. This year alone we have invested \$1.5 billion in research and development to bring meaningful innovations to market. And we're not just thinking about this at the product level, we're developing innovations for the therapy, procedure and system levels.

**THERAPY INNOVATION**

Medtronic has invested heavily in heart failure, where we provide meaningful innovations across the continuum of care to help rein in costs of the most expensive disease in healthcare today.

Every year, about one million patients are hospitalized with heart failure, costing \$31 billion in direct and indirect costs.<sup>3,4</sup> At least half of these patients will be readmitted to the hospital within six months with an average cost of \$8,184, while the average reimbursement for such a visit is \$6,111. This means hospitals will lose money on every patient that comes in for heart failure-related readmission.<sup>5</sup> This, in part, is why the cost to treat the condition is expected to more than double to \$70 billion by 2030.<sup>6</sup>



*The cost to treat heart failure is expected to increase from \$31 billion in 2012 to \$70 billion by 2030.<sup>6</sup>*

Medtronic engineers realized one way to help matters was to allow cardiac resynchronization therapy (CRT) devices to adapt to the individual rhythms of each patient's heart. This was accomplished with a novel algorithm, which was added to our CRT devices. Such minute adjustments ended up yielding significant value, including reducing atrial fibrillation by 46 percent,<sup>7</sup> and overall hospital readmissions by 21 percent.<sup>8</sup> But our therapy innovations go well beyond just heart disease. Some of our other therapy innovations that have recently been introduced include a miniaturized heart monitor — Reveal LINQ — that has the capability to remotely monitor the heart for three years for abnormal heart rhythms that could lead to stroke, and the Solitaire stent retriever, which mechanically removes blood clots in the brain that are causing a stroke.

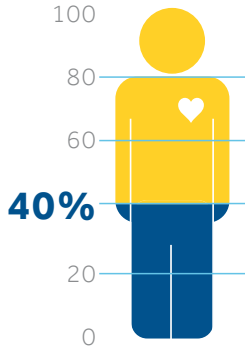
**PROCEDURAL INNOVATION**

Lung cancer is the leading cause of cancer-related deaths in the U.S.<sup>9</sup> In its early stages, few, if any, symptoms are apparent so most patients are diagnosed in the late stages, when survival rates decline drastically. Catching this disease at the beginning, when it's more curable, can improve the chances of long-term survival. However, one of the difficulties in diagnosing patients is getting enough tissue samples from the lung.

To address this issue, Medtronic now offers a unique, minimally invasive tissue biopsy tool and navigation system — superDimension — to reach difficult areas of the lung. Multidisciplinary clinics that included our technology in their offerings saw improvements in quality of care and patient satisfaction.<sup>10</sup> And because

the system allows physicians to reach lesions deep in the lung periphery where small lesions may reside, physicians can diagnose these smaller lesions earlier and start treatment sooner.

Other procedural innovations — such as artificial heart valves that are recapturable so that physicians can make sure the device is implanted in exactly the right spot, and a wireless pacemaker than can be implanted directly within the heart so that patients don't have to go through open-heart surgery — are just some of the ways we're using technology to make medical procedures easier and more successful.



By 2020, the World Congress of Cardiology estimates that 40 percent of deaths in India will be from heart disease.<sup>11</sup>

### SYSTEM INNOVATION

Emerging markets face unique obstacles in their quest to stand up and establish sustainable, high quality, and cost-effective health systems. Access is typically impacted by location and proximity to quality health institutions, a lack of quality trained specialists and healthcare practitioners, and a lack of infrastructure or facilities.

In India, the rapid rise of heart disease has earned the country the title “the cardiovascular disease capital of the world.” By 2020, the World Congress of Cardiology estimates that 40 percent of deaths in India will be from heart disease. A combination of lack of awareness, access to healthcare, and affordability of that care are all barriers preventing individuals from seeking treatment.<sup>11</sup>

Medtronic’s “Healthy Heart For All” program — which works with local hospitals and physicians to remove barriers to patient access to heart rhythm and vascular treatments — is an early and successful example of our emerging market care pathway approach to help overcome these barriers. The program works to continually evaluate and improve the entire cardiac patient care pathway and it has worked to resolve issues associated with patient awareness and screening, referral connections between general physicians and specialists, and counseling and financing options for patients who need financing assistance to access therapy options. The program works with more than 120 facilities across more than 22 cities in India. To date, more than 1,200 physicians have been trained, 147,000 patients have been screened and more than 14,000 of these patients have received treatment.

In addition, Medtronic is working along similar lines in the developed UK market with our own partnerships. Through Medtronic’s Integrated Health Solutions business, we are finding new ways to work with and within hospitals to reduce the cost of care within a risk-sharing arrangement.

## \$1 BILLION in cardiac care

Medtronic currently runs cath labs in 50 hospitals, efficiently managing \$1 billion in cardiac care.

A program was recently conducted with the Imperial College Healthcare NHS Trust in the UK, a major teaching hospital recognized as a center of excellence in cardiology and cardiothoracic surgery that treats more than 20,000 patients annually. By renewing aging cath lab equipment with the most innovative medical technology available and by optimizing daily operations, Medtronic was able to show significant value creation — including efficiency savings — estimated at £840,000 in the first year. The partnership did this through improving capacity, reducing waiting lists, and allowing more focus on core clinical activities. Based on the success of this program and others like it, we’ve taken key learnings and are now expanding this program into other regions around the world. We currently run cath labs in 50 hospitals, efficiently managing \$1 billion in cardiac care.

### INNOVATING TOGETHER

It will take bold thinking on all levels if we are to have the same results in this century in reducing chronic conditions as we did in the last century with infectious diseases.

Medtronic is looking at how our technology and expertise can be used in new and exciting ways, but we also realize it’s the partnerships we form around the world that can lead to the biggest advances for patients, hospitals, and systems.

Join us as we go Further, Together and continue to create meaningful innovations.



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