Medtronic News

# Data Show Medtronic Quadripolar CRT Technology Optimizes Treatment for Heart Failure Patients

*Positive Results from Two Studies Featured at Heart Rhythm Society 36th Annual Scientific Sessions*

**DUBLIN and BOSTON - MAY 18, 2015**-Medtronic plc (NYSE: MDT) today announced study results demonstrating that its quadripolar cardiac resynchronization therapy (CRT) system gives physicians more options to optimize CRT delivery, which may improve heart failure patients' response to the therapy. During Heart Rhythm 2015, the Heart Rhythm Society's 36th Annual Scientific Sessions in Boston, data from the Attain® Performa® Quadripolar Lead Clinical Study revealed the clinical benefits associated with steroid on all four electrodes. A separate analysis demonstrated the importance of assessing pacing vectors over time. VectorExpress(TM) technology, an easy-to-use tool found on Medtronic Viva® Quad CRT-defibrillators, provides clinically actionable information to help physicians select and maintain the optimal pacing configurations - at implant and in follow-up visits - for each patient, in only two minutes.

"When physicians pair Attain Performa leads with Viva Quad devices and the AdaptivCRT technology to treat their heart failure patients, they have more options to optimize therapy delivery and personalize treatment," said David Steinhaus, M.D., vice president and general manager, Heart Failure, and medical director for the Cardiac Rhythm and Heart Failure business, which is part of the Cardiac and Vascular Group at Medtronic. "These new data support the clinical benefits of CRT technology and add to the body of evidence supporting Medtronic quadripolar leads and CRT devices as an important therapy option for patients with heart failure."

## Effectiveness of Steroid-Eluting Electrodes on Quadripolar LV Leads

Results from an analysis of the Attain Performa Quadripolar Lead Clinical Study showed that the inclusion of steroid on all four electrodes in these quadripolar left ventricular (LV) leads stabilized pacing capture thresholds (PCTs) and impedance values over time. PCT is the level of energy the device must expend in order to pace the heart. The data, on 960 patients followed at six months, showed that steroid elution was effective on all vectors and that the greatest benefit was found at more proximal sites. These results suggest that the use of steroids may provide greater opportunities for basal pacing (near the top of the heart), avoiding phrenic nerve stimulation (PNS) and prolonging generator longevity.

Steroid on all electrodes led to a statistically significant reduction in PCTs compared to leads without steroid on all electrodes ($p<0.0001$). These lower thresholds give physicians more usable options to achieve optimal pacing while improving longevity.

"While we have known that steroid-eluting electrodes on cardiac leads are important for chronic cardiac lead performance, this is the first study to demonstrate the benefits of steroid-elution on all quadripolar electrodes of a left ventricular lead. The Performa left ventricular lead is unique in having four steroid eluting electrodes, which enables more choices when programming the device, may improve CRT delivery, may reduce complications of left ventricular pacing, and will give peace of mind over the chronic performance of the Performa lead," said Albert Lin, M.D., electrophysiologist at Northwestern Memorial Hospital and associate professor at Northwestern University Feinberg School of Medicine, Chicago.

## Serial Post-Implant LV Vector Selection and Device Longevity

A separate analysis from the Attain Performa Quadripolar Lead Clinical Study demonstrated the importance of assessing pacing vectors over time. VectorExpress technology was used to measure left ventricular PCTs and impedance in all 16 pacing vectors at implant, three months, six months and 12 months post-implant, to determine whether the selected pacing vector remained optimal. Over the course of 12 months of follow up, approximately 40 percent (of 824) patients' optimum pacing vector changed, demonstrating that pacing vectors need to be assessed and optimized on a regular basis.

"We are just beginning to understand the potential value of advancements in resynchronization therapy like quadripolar LV leads and automated software tools. For example, the VectorExpress tool offers robust method of assessing pacing capture and impedance data from all 16 vectors of a quadripolar lead in under 3 minutes," said Derek Exner, M.D., Professor, Libin Cardiovascular Institute of Alberta, Canada. "Using this VectorExpress data we can substantially enhance battery longevity and improve patient outcomes."

About the Attain Performa® Quadripolar Lead Portfolio and Viva CRT-Ds

The Attain Performa LV quadripolar lead portfolio includes three lead shapes (Dual Cant, S-Shape and Straight) with steroid on all electrodes and shorter spacing between the two center electrodes. These features, which are exclusive to the Attain Performa leads, give physicians more options to treat varying patient anatomies while also reducing the incidence of PNS, a potential side effect associated with CRT therapy that results in muscle twitching, hiccups or shortness of breath.i

All three Attain Performa leads are compatible with the company's newest portfolio of CRT devices, the Viva Quad XT and Viva Quad S CRT-D systems. The Viva Quad XT CRT-D also features the AdaptivCRT® algorithm. Recent data from a study published in the *Journal of the American College of Cardiology: Heart Failure*showed that the AdaptivCRT algorithm was associated with a significant relative reduction in both all cause 30-day readmissions (46 percent) and heart failure 30-day readmissions (59 percent), when compared to echo-optimized CRT.

In collaboration with leading clinicians, researchers and scientists worldwide, Medtronic offers the broadest range of innovative medical technology for the interventional and surgical treatment of cardiovascular disease and cardiac arrhythmias. The company strives to offer products and services that deliver clinical and economic value to healthcare consumers and providers around the world.

**About Medtronic**

Medtronic plc (www.medtronic.com), headquartered in Dublin, Ireland, is the global leader in medical technology alleviating pain, restoring health and extending life for millions of people around the world.

**Any forward-looking statements are subject to risks and uncertainties such as those described in Medtronic's periodic reports on file with the Securities and Exchange Commission. Actual results may differ materially from anticipated results.**

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i Biffi et al. Effort of Bipolar Electrode Spacing on Phrenic Nerve Stimulation and Left Ventricular Pacing Thresholds: An Acute Canine Study. Circulation Arrhythmia and Electrophysiology. 2012.

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