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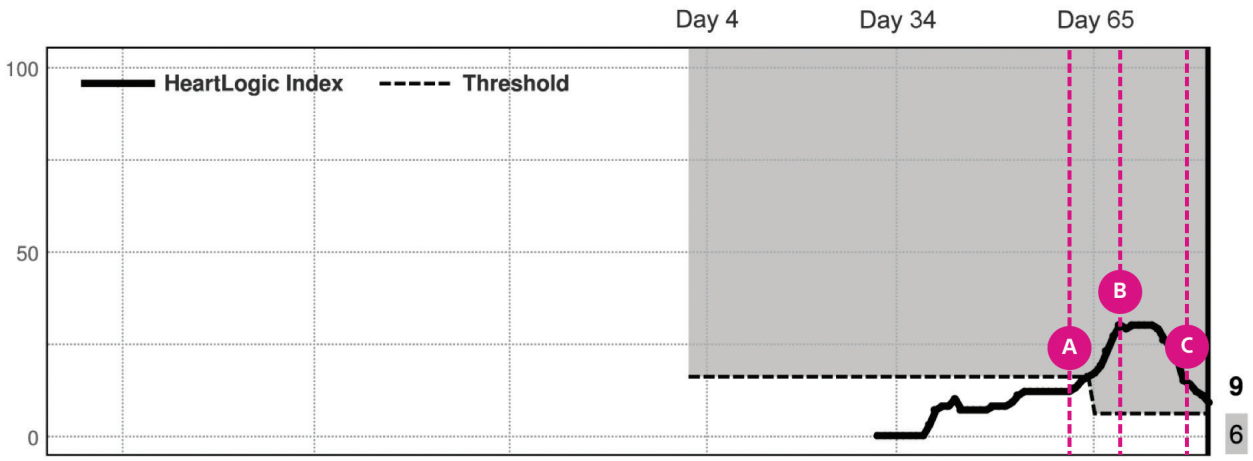
HeartLogic Detects Worsening Heart Failure Due to Patient Non-Compliance

Summary



A 30-year-old male with a history of non-compliance to medications was implanted with a Resonate™ family CRT-D, but did not immediately connect the LATITUDE Communicator.

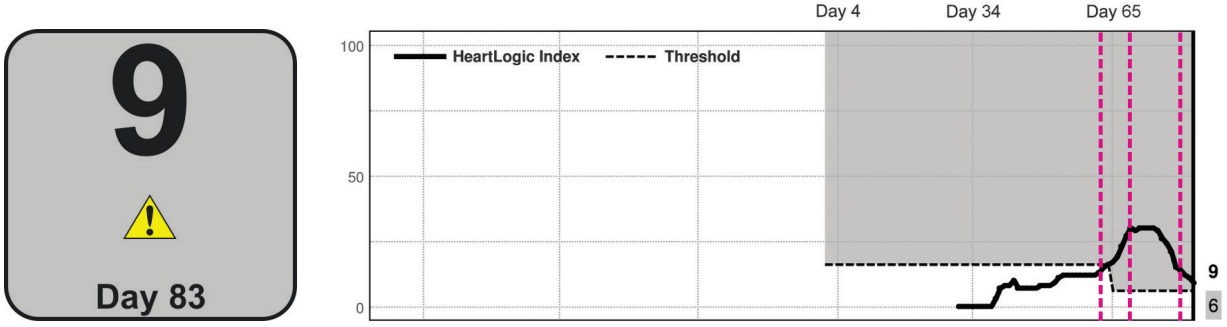
(A) Day 63: A HeartLogic alert occurred on October 30 due to elevated S3 heart sounds, S3/S1 ratio and night heart rate. Thoracic impedance did not detect worsening heart failure symptoms.

(B) Day 69: Six days later, the patient, feeling symptomatic, plugged in his LATITUDE Communicator which transmitted an alert. A phone call with the patient determined the patient was non-compliant with medications; Entresto® was increased and Aldactone® was started.

(C) Day 80: The patient lost 7 pounds and reported feeling better.

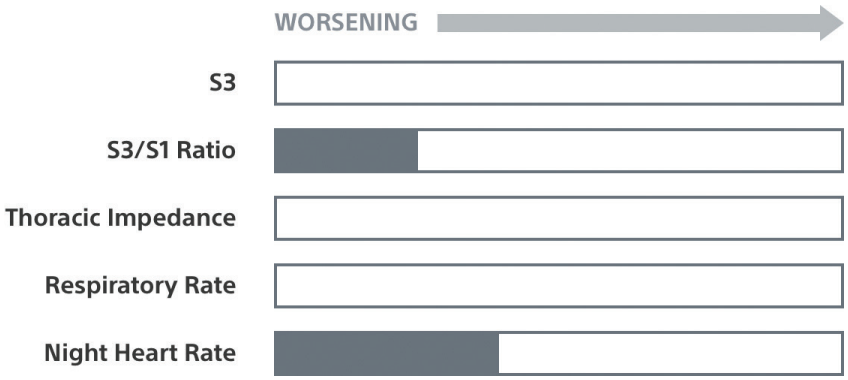
Clinical Data

HeartLogic Heart Failure Index

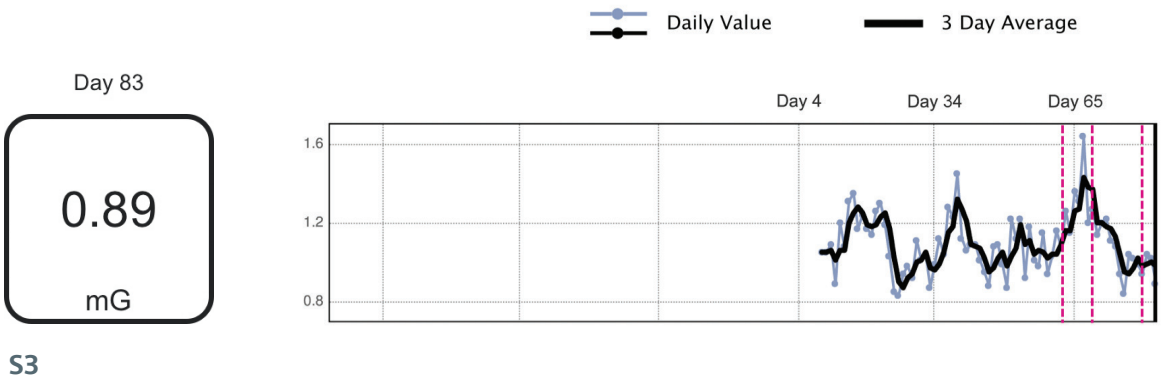


Contributing Trends

Note: Shaded portion indicates degree of worsening on Day 83.



Trend Graphs



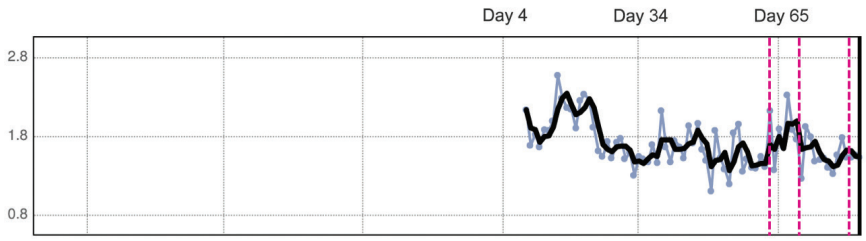
S3

Trend Graphs

Day 83

1.53

mG

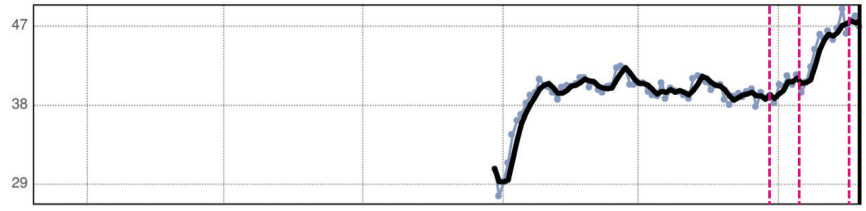


S1

Day 83

46.9

Ω

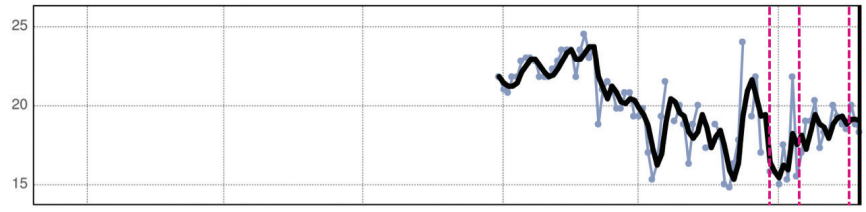


Thoracic Impedance

Day 83

18.3

rpm

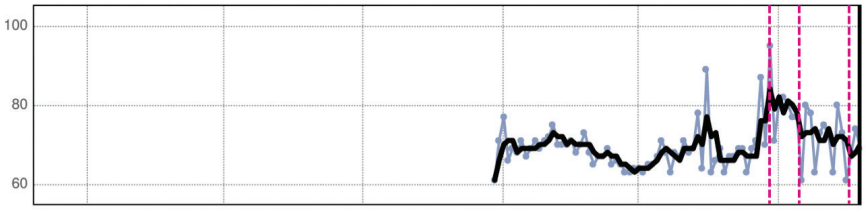


Respiratory Rate

Day 83

69

bpm

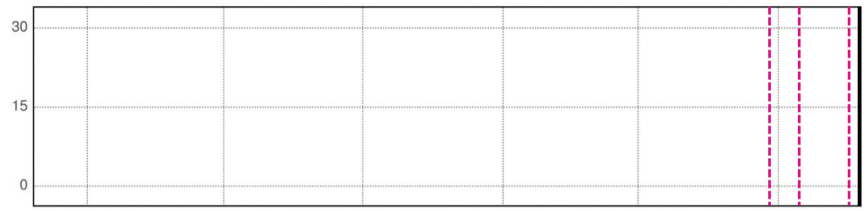


Night Heart Rate

Day 83

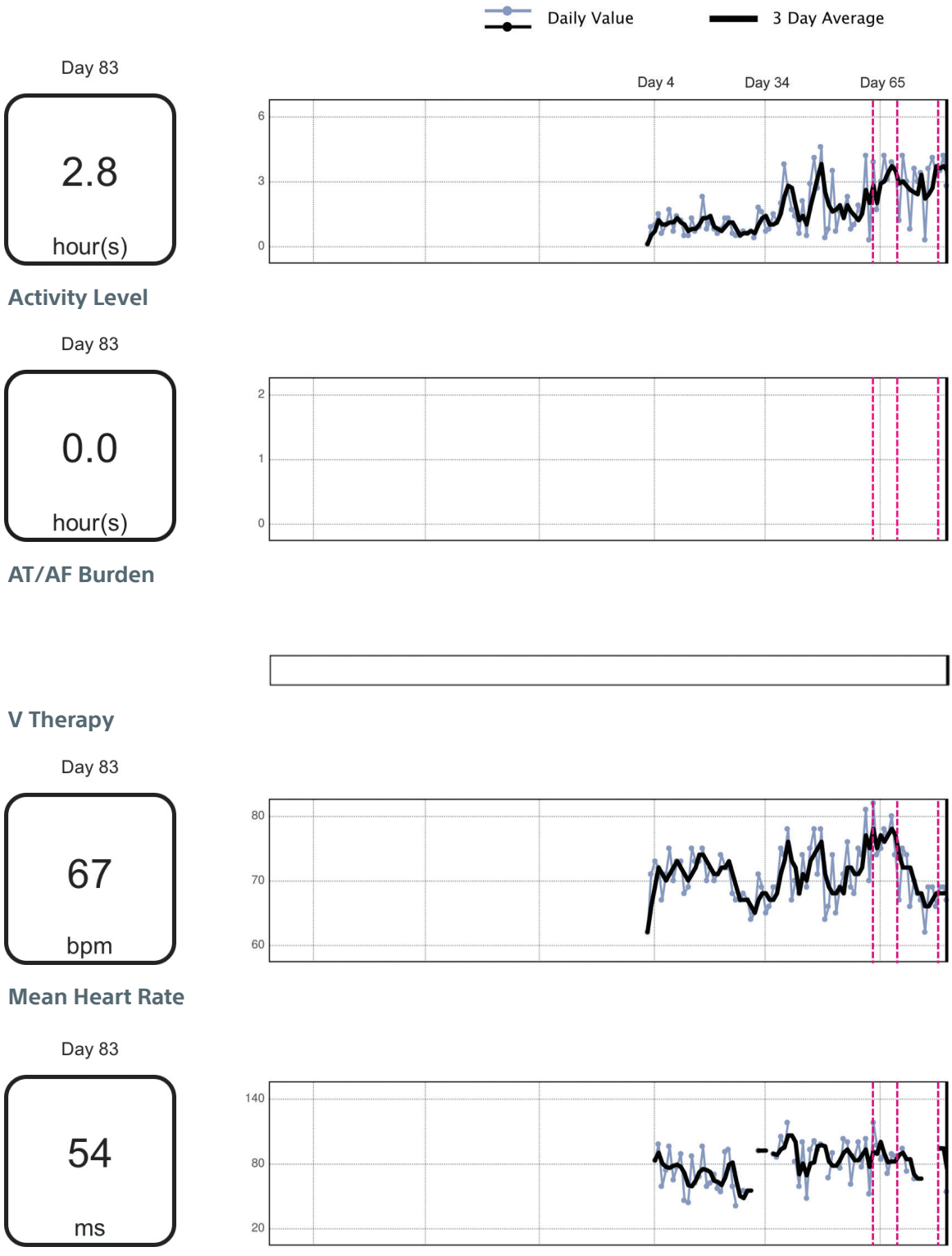
insufficient

degrees



Sleep Incline

Trend Graphs



Data Table & Timeline

LATITUDE™ NXT Patient Management – Heart Failure Management Report

Trend Data

Date	HeartLogic Heart Failure Index	S3 (mG)	S1 (mG)	Thoracic Impedance (Ω)	Respiratory Rate (rpm)	Night Heart Rate (bpm)	Sleep Incline (degrees)	Activity Level (hour(s))	AT/AF Burden (hour(s), events)
Day 83	9	0.89	1.53	46.9	18.3	69	N/R	2.8	0.0, 0
Day 82	11	1.02	1.56	48.1	18.8	74	N/R	4.2	0.0, 0
Day 81	12	1.04	1.53	47.6	20.0	68	N/R	3.5	0.0, 0
Day 80	14	0.94	1.53	46.1	18.5	61	N/R	3.3	0.0, 0
Day 79	15	0.99	1.78	48.9	18.8	73	N/R	4.1	0.0, 0
Day 78	21	1.02	1.56	46.7	19.3	80	N/R	3.6	0.0, 0
Day 77	24	1.04	1.32	45.4	20.0	63	N/R	0.3	0.0, 0
Day 76	26	0.84	1.40	46.4	18.3	72	N/R	3.4	0.0, 0
Day 75	29	0.94	1.52	45.6	18.3	75	N/R	3.0	0.0, 0
Day 74	30	1.08	1.50	46.0	17.3	73	N/R	3.6	0.0, 0
Day 73	30	1.11	1.48	44.3	20.3	63	N/R	0.8	0.0, 0
Day 72	30	1.22	1.79	42.3	19.0	78	N/R	3.0	0.0, 0
Day 71	30	1.20	1.92	40.6	19.0	80	N/R	4.2	0.0, 0
Day 70	29	1.14	1.26	39.4	17.0	61	N/R	1.2	0.0, 0
Day 69	30	1.27	1.76	41.4	15.5	77	N/R	3.6	0.0, 0
Day 68	27	1.20	1.88	40.3	21.8	77	N/R	3.9	0.0, 0
Day 67	23	1.64	2.32	41.3	15.3	80	N/R	3.1	0.0, 0
Day 66	19	1.31	1.66	40.1	17.5	82	N/R	4.2	0.0, 0
Day 65	17	1.36	1.89	40.3	15.0	81	N/R	3.0	0.0, 0
Day 64	16	1.15	1.37	38.2	N/R	71	N/R	1.7	0.0, 0
Day 63	15	1.26	2.12	39.1	15.8	95	N/R	3.9	0.0, 0
Day 62	13	1.07	1.41	38.8	N/R	70	N/R	0.3	0.0, 0
Day 61	12	1.16	1.54	39.4	17.0	87	N/R	4.2	0.0, 0
Day 60	12	1.03	1.39	37.8	21.8	71	N/R	1.6	0.0, 0
Day 59	12	0.94	1.40	39.8	19.3	69	N/R	1.9	0.0, 0
Day 58	12	1.15	1.51	39.5	N/R	63	N/R	1.0	0.0, 0
Day 57	12	0.98	1.35	38.9	24.0	69	N/R	0.8	0.0, 0
Day 56	12	1.01	1.95	39.3	17.8	69	N/R	2.3	0.0, 0
Day 55	12	1.18	1.84	39.0	16.3	67	N/R	1.7	0.0, 0
Day 54	12	0.92	1.19	38.0	14.8	67	N/R	1.6	0.0, 0
Day 53	11	1.22	1.38	38.6	15.0	63	N/R	0.7	0.0, 0
Day 52	9	1.12	1.52	40.3	18.0	69	N/R	3.5	0.0, 0
Day 51	8	1.22	1.87	40.2	18.8	66	N/R	0.8	0.0, 0
Day 50	8	0.87	1.10	39.7	N/R	63	N/R	0.4	0.0, 0
Day 49	8	0.99	1.49	40.6	17.3	89	N/R	4.6	0.0, 0
Day 48	7	1.09	1.63	41.2	N/R	64	N/R	2.7	0.0, 0
Day 47	7	1.08	1.96	41.3	20.0	78	N/R	4.1	0.0, 0
Day 46	7	0.88	1.71	41.0	18.8	69	N/R	2.9	0.0, 0
Day 45	7	0.95	1.93	38.7	16.3	68	N/R	0.5	0.0, 0
Day 44	7	1.01	1.52	39.1	18.8	71	N/R	2.1	0.0, 0
Day 43	10	1.09	1.66	39.5	20.0	67	N/R	0.6	0.0, 0
Day 42	8	1.09	1.74	39.6	19.0	68	N/R	1.4	0.0, 0
Day 41	8	1.06	1.47	39.9	N/R	63	N/R	1.7	0.0, 0

Data Table & Timeline

LATITUDE™ NXT Patient Management – Heart Failure Management Report

Date	Mean Heart Rate (bpm)	Heart Rate Variability (SDANN) (ms)
Day 83	67	54
Day 82	69	N/R
Day 81	69	94
Day 80	66	N/R
Day 79	69	N/R
Day 78	69	N/R
Day 77	62	N/R
Day 76	67	N/R
Day 75	68	N/R
Day 74	70	66
Day 73	66	N/R
Day 72	74	73
Day 71	75	94
Day 70	67	N/R
Day 69	74	87
Day 68	80	89
Day 67	77	71
Day 66	78	87
Day 65	75	84
Day 64	74	97
Day 63	82	118
Day 62	70	52
Day 61	81	103
Day 60	74	77
Day 59	75	100
Day 58	68	87
Day 57	69	61
Day 56	76	100
Day 55	71	103
Day 54	69	76
Day 53	65	N/R
Day 52	74	90
Day 51	66	67
Day 50	64	N/R
Day 49	78	98
Day 48	71	93
Day 47	78	101
Day 46	75	93
Day 45	69	48
Day 44	74	100
Day 43	68	59
Day 42	70	82
Day 41	67	N/R

Brief Summary Statement
RESONATE™ HF, RESONATE™ EL, PERCIVA™ HF, PERCIVA™, VIGILANT™ EL, MOMENTUM™ EL ICD – Manual 360199-003

CAUTION
Federal law (USA) restricts this device to sale by or on the order of a physician. Rx only. Prior to use, please see the complete "Directions for Use" for more information on Indications, Contraindications, Warnings, Precautions, Adverse Events, and Operator's Instructions.

INDICATIONS AND USAGE
Boston Scientific implantable cardioverter defibrillators (ICDs) are intended to provide ventricular antitachycardia pacing (ATP) and ventricular defibrillation for automated treatment of life-threatening ventricular arrhythmias.

CONTRAINDICATIONS
Use of these Boston Scientific pulse generators are contraindicated for the following: patients whose ventricular tachyarrhythmias may have reversible cause, such as: digitalis intoxication, electrolyte imbalance, hypoxia, sepsis; or patients whose ventricular tachyarrhythmias have a transient cause, such as: acute myocardial infarction (MI), electrocution, drowning; or patients who have a unipolar pacemaker.

WARNINGS
Read this manual thoroughly before implantation to avoid damage to the pulse generator and/or lead. For single patient use only. Do not reuse, reprocess, or resterilize. Always have external defibrillation equipment available during implant and electrophysiologic testing. Ensure that an external defibrillator and medical personnel skilled in CPR are present during post-implant device testing should the patient require external rescue. Do not use this pulse generator with another pulse generator. Program the pulse generator Tachy Mode(s) to Off during implant, explant, or postmortem procedures to avoid inadvertent high voltage shocks. Do not kink, twist, or braid the lead with other leads as doing so could cause lead insulation abrasion damage or conductor damage. For leads that require the use of a Connector Tool, use caution handling the lead terminal when the Connector Tool is not present on the lead. Do not directly contact the lead terminal with any surgical instruments or electrical connections such as PSA (alligator) clips, ECG connections, forceps, hemostats, and clamps. Do not contact any other portion of the DF4–LLHH or DF4–LLHO lead terminal, other than the terminal pin, even when the lead cap is in place. Do not use atrial tracking modes in patients with chronic refractory atrial tachyarrhythmias. Tracking of atrial arrhythmias could result in ventricular tachyarrhythmias. Advise patients to seek medical guidance before entering environments that could adversely affect the operation of the active implantable medical device, including areas protected by a warning notice that prevents entry by patients who have a pulse generator. RESONATE HF, RESONATE, PERCIVA HF, PERCIVA, VIGILANT and MOMENTUM devices are considered MR Conditional. For these devices, unless all of the MRI Conditions of Use are met, MRI scanning of the patient does not meet MR Conditional requirements for the implanted system, and significant harm to or death of the patient and/or damage to the implanted system may result. Do not expose patients with non-MR conditional devices to MRI scanning. For potential adverse events applicable when the Conditions of Use are met or not met, refer to the MRI Technical Guide. Do not subject a patient with an implanted pulse generator and/or lead to diathermy. If desired, ensure that Patient Triggered Monitor is enabled prior to sending the patient home. Once the Patient Triggered Monitor feature has been triggered by the magnet and an EGM has been stored, or after 60 days have elapsed from the day that Store EGM was enabled, the patient should not apply the magnet.

PRECAUTIONS
For specific information on precautions, refer to the following sections of the product labeling: clinical considerations, sterilization and storage, implantation, device programming, environmental and medical therapy hazards, hospital and medical environments, home and occupational environments, follow up testing, explant and disposal, supplemental precautionary information.

POTENTIAL ADVERSE EVENTS
Based on the literature and on pulse generator and/or lead implant experience, the following alphabetical list includes the possible adverse evets associated with the included devices: Air embolism; Allergic reaction; Bleeding; Bradycardia; Cardiac tamponade; Chronic nerve damage; Component failure; Conductor coil fracture; Death; Elevated thresholds; Erosion; Excessive fibrotic tissue growth; Extracardiac stimulation (muscle/nerve stimulation); Failure to convert an induced arrhythmia; Fluid accumulation; Foreign body rejection phenomena; Formation of hematomas or seromas; Heart block; Heart failure following chronic RV apical pacing; Inability to defibrillate or pace; Inappropriate therapy (e.g., shocks and antitachycardia pacing (ATP) where applicable, pacing; Incisional pain; Incomplete lead connection with pulse generator; Infection including endocarditis; Insulating myocardium during defibrillation with internal or external paddles; Lead dislodgement; Lead fracture; Lead insulation breakage or abrasion; Lead perforation; Lead tip deformation and/or breakage; Local tissue reaction; Loss of capture; Myocardial infarction (MI); Myocardial necrosis; Myocardial trauma (e.g., tissue damage, valve damage); Myopotential sensing; Oversensing/undersensing; Pacemaker-mediated tachycardia (PMT); Pericardial rub, effusion; Pneumothorax; Pulse generator migration; Shunting current during defibrillation with internal or external paddles; Syncope; Tachyarrhythmias, which include acceleration of arrhythmias and early, recurrent atrial fibrillation; Thrombosis/thromboemboli; Valve damage; Vasovagal response; Venous occlusion; Venous trauma (e.g., perforation, dissection, erosion); Worsening heart failure.

For a list of potential adverse events associated with MRI scanning, refer to the MRI Technical Guide
Patients may develop psychological intolerance to a pulse generator system and may experience the following: Dependency; Depression; Fear of premature battery depletion; Fear of a device malfunction.

Indications, Safety and Warnings
CRT-D Systems – RESONATE™HF, RESONATE™, RESONATE™X4, VIGILANT™, VIGILANT™X4, MOMENTUM™, MOMENTUM™ X4

INDICATIONS AND USAGE
These Boston Scientific Cardiac Resynchronization Therapy Defibrillators (CRT-Ds) are indicated for patients with heart failure who receive stable optimal pharmacologic therapy (OPT) for heart failure and who meet any one of the following classifications: Moderate to severe heart failure (NYHA Class III-IV) with EF ≤ 35% and QRS duration ≥ 120 ms; or left bundle branch block (LBBB) with QRS duration ≥ 130 ms, EF ≤ 30%, and mild (NYHA Class II) ischemic or nonischemic heart failure or asymptomatic (NYHA Class I) ischemic heart failure

CONTRAINDICATIONS
There are no contraindications for this device.

WARNINGS
Read this manual thoroughly before implantation to avoid damage to the pulse generator and/or lead. For single patient use only. Do not reuse, reprocess, or resterilize. Always have external defibrillation equipment available during implant and electrophysiologic testing. Ensure that an external defibrillator and medical personnel skilled in CPR are present during post-implant device testing should the patient require external rescue. Do not use defibrillation patch leads with the pulse generator system. Do not use this pulse generator with another pulse generator. Program the pulse generator Tachy Mode(s) to Off during implant, explant, or postmortem procedures. Do not kink, twist, or braid the lead with other leads. For leads that require the use of a Connector Tool, use caution handling the lead terminal when the Connector Tool is not present on the lead. Do not directly contact the lead terminal with any surgical instruments or electrical connections such as PSA (alligator) clips, ECG connections, forceps, hemostats, and clamps. Do not contact any other portion of the DF4–LLHH or DF4–LLHO lead terminal, other than the terminal pin, even when the lead cap is in place. Do not contact any other portion of the IS4–LLLL lead terminal, other than the terminal pin, even when the lead cap is in place. When implant a system that uses both a DF4–LLHH or DF4–LLHO and IS4–LLLL lead, ensure that the leads are inserted and secured in the appropriate ports. Do not use atrial tracking modes in patients with chronic refractory atrial tachyarrhythmias. Do not use atrial-only modes in patients with heart failure. Left ventricular

lead dislodgement to a position near the atria can result in atrial oversensing and left ventricular pacing inhibition. Physicians should use medical discretion when implanting this device in patients who present with slow VT. Advise patients to seek medical guidance before entering environments that could adversely affect the operation of the active implantable medical device, including areas protected by a warning notice that prevents entry by patients who have a pulse generator. RESONATE HF, RESONATE, and VIGILANT devices with an IS-1/DF4/IS4 lead connection are considered MR Conditional. For these devices, unless all of the MRI Conditions of Use are met, MRI scanning of the patient does not meet MR Conditional requirements for the implanted system, and significant harm to or death of the patient and/or damage to the implanted system may result. For potential adverse events applicable when the Conditions of Use are met or not met, refer to the MRI Technical Guide. Do not subject a patient with an implanted pulse generator and/or lead to diathermy. If desired, ensure that Patient Triggered Monitor (PTM) is enabled prior to sending the patient home by confirming the magnet response is programmed to Store EGM. Once the PTM feature has been triggered and the magnet response set to Inhibit therapy the patient should not reapply the magnet.

PRECAUTIONS
For specific information on precautions, refer to the following sections of the product labeling: clinical considerations, sterilization and storage, implantation, device programming, environmental and medical therapy hazards, hospital and medical environments, follow up testing, explant and disposal, supplemental precautionary information. Advise patients to avoid sources of EMI because EMI may cause the pulse generator to deliver inappropriate therapy or inhibit appropriate therapy.

POTENTIAL ADVERSE EVENTS
Based on the literature and on pulse generator and/or lead implant experience, the following alphabetical list includes the possible adverse evets associated with the included devices: Air embolism; Allergic reaction; Bleeding; Bradycardia; Cardiac tamponade; Chronic nerve damage; Component failure; Conductor coil fracture; Death; Electrolyte imbalance/dehydration; Elevated thresholds; Erosion; Excessive fibrotic tissue growth; Extracardiac stimulation (muscle/nerve stimulation); Failure to convert an induced arrhythmia; Fluid accumulation; Foreign body rejection phenomena; Formation of hematomas or seromas; Heart block; Inability to defibrillate or pace; Inappropriate therapy (e.g., shocks and antitachycardia pacing (ATP) where applicable, pacing); Incisional pain; Incomplete lead connection with pulse generator; Infection including endocarditis; Insulating myocardium during defibrillation with internal or external paddles; Lead dislodgement; Lead fracture; Lead insulation breakage or abrasion; Lead perforation; Lead tip deformation and/or breakage; Local tissue reaction; Loss of capture; Myocardial infarction (MI); Myocardial necrosis; Myocardial trauma (e.g., tissue damage, valve damage); Myopotential sensing; Oversensing/undersensing; Pacemaker-mediated tachycardia (PMT); Pericardial rub, effusion; Pneumothorax; Pulse generator migration; Shunting current during defibrillation with internal or external paddles; Syncope; Tachyarrhythmias, which include acceleration of arrhythmias and early, recurrent atrial fibrillation; Thrombosis/thromboemboli; Valve damage; Vasovagal response; Venous occlusion; Venous trauma (e.g., perforation, dissection, erosion); Worsening heart failure.

For a list of potential adverse events associated with MRI scanning, refer to the MRI Technical Guide

Patients may develop psychological intolerance to a pulse generator system and may experience the following: Dependency; Depression; Fear of premature battery depletion; Fear of a device malfunction.

Additionally, potential adverse events associated with the implantation of a coronary venous lead system include: Allergic reaction to contrast media; Breakage/failure of implant instruments; Prolonged exposure to fluoroscopic radiation; Renal failure from contrast media used to visualize coronary veins.

Refer to the product labeling for specific indications, contraindications, warnings/precautions and adverse events. Rx only.

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Results from the case studies are not necessarily predictive of results in other cases. Results in other cases may vary.

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Prior to use, review DFU for indications, contraindications, warnings, precautions, adverse events and operating instructions.

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