CARDIAC RHYTHM MANAGEMENT

Product Performance Report

Important Patient Management Information for Physicians

2024

1st Edition – Issue 90

Medtronic

CRM Product Performance Report

2024

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Issue 90

Cutoff date for this edition is 29 February 2024 for Lead Study data and 09 April 2024 for all other data, unless otherwise stated.

Our Commitment to Quality

Medtronic was founded in 1949 and has grown to become a global leader in medical technology. Seeing what a difference medical technology could make in the lives of patients inspired our founder to develop the Medtronic Mission.

The third tenet of the mission is all about quality:

"To strive without reserve for the greatest possible reliability and quality in our products, to be the unsurpassed standard of comparison, and to be recognized as a company of dedication, honesty, integrity, and service."

Regardless of function, all CRM employees play a role in product quality. Whether designing new therapies, sourcing components, manufacturing products, hiring talented people, assigning financial resources to project teams, or serving in one of the hundreds of other roles, every employee has an influence on product quality.

Product performance information is received from many sources through various channels. Medtronic monitors information from many sources from Research and Development through Manufacturing and Field Performance Vigilance.

When a device is returned to Medtronic, laboratory technicians and engineers assess overall device function. Analysis of returned product is performed according to written procedures. These procedures determine the minimum analysis required. The analysis required varies depending on the type of device, age of the device, the associated information received with the device, actual experience with models of similar design, and other factors. Additional analysis is performed as necessary to investigate a performance concern from a customer, or to collect specific reliability data.

When a malfunction is identified, failure analysis is performed to provide the detailed information necessary to investigate possible causes and actions. Medtronic CRM maintains in-house expertise and performs its failure analysis using facilities it owns and supports. This capability permits detailed failure analysis.

Analysis results are compared to original manufacturing records and design intent. Clinical observations are added to laboratory findings to help determine root cause. Each event is then compared to other events. If a pattern is detected, actions are taken to identify a common root cause, assess patient risk and an appropriate course of action.

Medtronic instituted the industry's first product performance reports in 1983 by publishing data on our chronic lead studies. Pacemakers and other devices followed as our performance reporting has constantly evolved based on customer needs and feedback. One thing has been a constant. It is our sincere commitment to communicate clearly, offering timely and appropriate product performance data and reliability information. This has always been and will continue to be our goal.

Contact Information

We invite our customers to use these telephone numbers to call with suggestions, inquiries, or specific problems related to our products.

US Technical Services Department

tshelp@medtronic.com

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1 (800) 723-4636 (Tachy)

1 (800) 505-4636 (Brady)

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au.crdmtechservices@medtronic.com

For questions related to returning explanted product or returning product that shows signs of malfunction, please contact:

Outside the United States:

Your Medtronic representative or international technical center at the number above.

Within the United States:

Your Medtronic representative or

CRM Returned Product Analysis Laboratory

Phone: 1 (800) 328-2518, ext. 44800

crdm.returnedproduct@medtronic.com

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Primo MRI™
Protecta®
Quick Look™
Relia™
Reveal LINQ™
Revo MRI®
Secura®
Secure®
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Introduction

For 40 years, Medtronic has monitored performance via both returned product analysis and multicenter clinical studies.

This Product Performance Report (PPR) presents device survival estimates, advisory summaries, performance notes, and other information pertinent to assessing the performance of Medtronic implantable pulse generators (IPGs), implantable cardioverter defibrillators (ICDs), cardiac resynchronization therapy (CRT) devices, and implantable pacing and defibrillation leads.

This Product Performance Report has been prepared in accordance with International Standard ISO 5841-2:2000(E). As Transcatheter Pacing Systems (TPS) combine the pacing functions of an IPG with the therapy delivery functions of an implantable lead into a single device implanted inside the heart, TPS is subject to complications similar to pacing leads and malfunctions or battery depletion events similar to an implanted pulse generator (IPG). The TPS performance report has been developed to align with these guidelines to the extent possible due to the unique difference between TPS compared to a typical implantable device or lead.

The survival estimates provided in this report are considered to be representative of worldwide performance.

Survival Estimates

Medtronic, like other companies, monitors CRT, ICD, and IPG device performance using returned product analysis. We also monitor CRT, ICD, and IPG device performance using an active multicenter clinical study.

Returned product analysis is a passive approach to assessing product performance. This approach provides a suitable measure of product performance only when a significant number of explanted products are returned to the manufacturer. Returned product analysis provides a measure of hardware performance, but not necessarily the total clinical performance (e.g., the incidence of complications such as infection, erosion, muscle stimulation, etc. are not estimated).

The survival estimates provided in this report for CRT, ICD, and IPG devices are based on returned product analysis. This approach is suitable because a significant number of explanted generators are returned for analysis.

Lead performance is monitored differently. In contrast to CRT, ICD, and IPG devices, a very small percentage of leads are returned to the manufacturer due to the difficulty of explanting them. For leads, an active clinical study provides more accurate survival estimates compared to estimates based solely on returned product analysis.

Survival estimates for leads are based on clinical observations recorded via Medtronic's PAN Registry. This multicenter clinical study is designed to record clinical observations representative of the total clinical experience. Therefore, the lead survival estimates include both lead hardware failure and lead-related medical complications, and do not differentiate a lead hardware failure from other clinical events such as exit block, perforation, dislodgement, or concurrent pulse generator failure.

Transcatheter Pacing Systems are monitored differently. Transcatheter pacing systems (TPS) combine the pacing functions of an IPG with the therapy delivery functions of an implantable lead into a single device implanted inside the heart. To account for the shortfalls of returned product analysis due to a very small percentage of devices being returned, a study of de-identified product data on the Medtronic CareLink™ network is used. The number of devices enrolled and transmitting actively enables a population large enough to give a representative volume of normal battery depletions and to provide insight into the complications that may occur after the device was successfully implanted. TPS survival estimates include both product failures and device-related medical complications and do not differentiate product failures from these complications such as perforation, dislodgement or elevated pacing thresholds.

Introduction continued

ICD Charge Times

Since May 2000, Medtronic has provided important information on charge time performance of ICDs. The information provided in this report shows how ICD charge time can vary during the time a device is implanted. The information is presented in graphical format showing charge time as a function of implant time. The data for charge times are collected from devices enrolled in the PAN Registry.

Customer Communications - Advisory Summaries

This Product Performance Report includes summaries of all Customer Communications classified as Advisories applicable to the performance of the products included in the report. An advisory is added to the report when any product affected by the advisory remains in service and at risk of experiencing the behavior described in the advisory. The advisory will remain in the report until Medtronic estimates no product affected by the advisory remains active, or the risk of experiencing the behavior described in the advisory has passed.

For most advisories, the products subject to the advisory retain essentially the same survival probability as the products of the same model(s) not affected by the advisory. For those advisories where the survival probabilities of the affected and non-affected populations do differ significantly, Medtronic will provide separate survival data for each population. The separate survival data will remain in the report until Medtronic estimates no affected product remains in active service.

Customer Communications - Performance Notes

This report concludes with a number of Customer Communications classified as Non-Advisory Performance Notes developed by Medtronic to provide additional product performance information relevant to follow-up practice and patient management.

Customer Communications - Product Education Briefs

These communications are educational in nature and typically elaborate on information found in the Instructions for Use (IFU) or other approved labeling materials. A product education brief typically serves to clarify information found in labeling that may be misunderstood or misinterpreted by physicians or healthcare professionals. Product education briefs do not provide new patient management guidance, but may be used to reinforce existing recommendations already discussed in the IFU.

How You Can Help

Medtronic urges all physicians to return explanted products and to notify Medtronic when a product is no longer in use, regardless of the reason for explant or removal from use. The procedures for returning products vary by geographic location.

Mailer kits with prepaid US postage are available for use within the United States to send CRTs, ICDs, IPGs, ICMs, and leads to Medtronic's Cardiac Rhythm Management (CRM) Returned Product Analysis Lab. These mailers are sized to accommodate the devices and leads from a single patient or clinical event and are designed to meet US postal regulations for mailing biohazard materials.

If the product being returned is located outside the United States, please contact your local Medtronic representative for instructions.

Medtronic also requests the return of explanted products from non-clinical sources, such as funeral homes, and will assume responsibility for storage and disposal of the product once received.

Mailer kits can be obtained by contacting the Returned Product Lab. For information on how to contact the Lab, refer to the Contact Information page of this report.

We continually strive to improve this CRM Product Performance Report. In keeping with this philosophy, we ask for your suggestions on the content and format of this report, as well as any information you have regarding the performance of Medtronic products. For information on how to comment on this report, see the Contact Information page.

Overview of Survival Analysis

Medtronic uses the Cutler-Ederer actuarial life table method for devices, standard actuarial method for TPS and Kaplan-Meier for leads to estimate the length of time over which they will perform within performance limits established by Medtronic. This probability to perform within performance limits over time is called the survival probability.

Devices and leads are followed until an event occurs where the device or lead ceases to operate within performance limits. The length of time from implant to the event is recorded for individual devices and leads in the population sample. The population sample for CRT, ICD, and IPG devices is made up of patients whose devices are registered as implanted in the United States. For leads, the population sample is the patients enrolled in our multicenter, international prospective Product Surveillance Registry. For TPS, the population is the de-identified devices on the Medtronic CareLink™ network.

For CRTs, IPGs and ICDs, the events can be normal battery depletion or a device malfunction. For leads, the events are complications as defined in the study protocol. For TPS, the events are complications or malfunctions as defined in the methods for estimating.

The actuarial life table method allows Medtronic to account for devices and leads removed from service for reasons unrelated to performance and for device and leads still in service. Devices and leads removed for reasons unrelated to performance or are still in service are said to be suspended. Examples of devices and leads removed from service for reasons unrelated to performance include:

- Removed to upgrade the device or lead
- No longer in service due to the death of the patient for reasons unrelated to the device or leads
- Implanted in patients who are lost to follow-up

For each suspension, the device or lead has performed within performance limits for a period of time, after which its performance is unknown.

Confidence Intervals

Since survival curves are based on a sample of the device and lead population, they are only estimates of survival. The larger the effective sample size, the more confident the estimate. A confidence interval can be calculated to assess the confidence in an estimate. In the Product Performance Report, Medtronic provides a 95% confidence interval. This can be interpreted as meaning that 95% of the time, the true survival of the device will fall somewhere in the interval.

Survival Curves in the Product Performance Report

Since the survival estimate can become very imprecise with small effective sample sizes, Medtronic truncates the survival curve when the effective sample size is less than 100 for CRTs, ICDs, and IPGs, and when the number entered is less than 50 for leads. The survival charts in the Product Performance Report show the effective sample size for

Introduction continued

each year interval where Medtronic has experience. When the effective sample size reaches 100 for CRTs, ICDs, and IPGs or when the number entered reaches 50 for leads, the next data point is added to the survival curve.

Although the report provides tabular data in one-year intervals, the device curves are actually computed and plotted using the Cutler-Ederer method and 1-month intervals (for CRT, ICD, and IPG devices), the TPS curves are actually computed and plotted using the standard actuarial method and 1-month intervals, and leads curves are computed and plotted using Kaplan-Meier, which uses individual survival times.

A number of references are available for additional information on survival analysis using the Cutler-Ederer life table method[1] and for the Kaplan-Meier method.[2]

[1]Lee, Elisa T.(2003) Statistical Methods for Survival Data Analysis – 3rd Edition (Wiley Series in Probability and Statistics).

[2]Klein, John P., Moeschberger, Melvin L. Survival Analysis Techniques for Censored and Truncated Data, New York: Springer-Verlag New York, Inc., 1997.

Method for Estimating CRT, ICD, and IPG Device Performance

The performance of CRT, ICD, and IPG devices is expressed in terms of device survival estimates, where "survival" refers to the function of the device, not the survival of the patient. These survival estimates are intended to illustrate the probability that a device will survive for a given number of years without malfunction or battery depletion.

The survival estimates are determined from the analysis of Medtronic Cardiac Rhythm Management (CRM's) United States device registration data and United States returned product analysis data. These data are presented graphically and numerically.

Note: During preparation of the Issue 88 CRM PPR release, a display error with the population of the malfunctions table was identified that resulted in historical overcounting in Issue 87 and prior of some confirmed malfunctions displayed in these tables. This overcounting did not affect the survival curves. The overcounting has been corrected with the Issue 88 release.

Because this analysis is based on returned product analysis, the performance data does not reflect any device-related medical complications such as erosion, infection, muscle stimulation, or muscle inhibition.

Categorization of Depleted and Malfunctioning Devices for Survival Analysis

For survival estimation, every device analyzed in the CRM Returned Product Analysis laboratory is assigned to one of three categories. The device 1) is functioning normally, 2) has reached normal battery depletion, or 3) has malfunctioned. This categorization is combined with data from our device registry for the total number of implants and the implant durations to create the survival curves presented on the following pages.

Definition of Malfunction

In alignment with industry guidance, Medtronic CRM considers a device as having malfunctioned when the device is removed from service and the analysis shows that any parameter was outside the performance limits established by Medtronic while in service.

Devices damaged after explant, damaged due to failure to heed warnings or contraindications in the labeling, or damaged due to interaction with other implanted devices (including leads) are not considered device malfunctions.

A device subject to a safety advisory is not considered to have malfunctioned unless it has been found, through analysis, to have performed outside the performance limits established by Medtronic.

Not all malfunctions expose the patient to a loss of therapy. Some malfunctions included in the following survival estimates may not have been detected at all by the physician or the patient. All malfunctions, however, are included in the survival estimates and provide important feedback to our product development organization.

To provide insight into the nature of malfunctions, each malfunction is categorized as Malfunction with Compromised Therapy Function or Malfunction without Compromised Therapy Function.

For this report, Normal Battery Depletion, Malfunction with Compromised Therapy Function, and Malfunction without Compromised Therapy Function are defined as follows:

Normal Battery Depletion – The condition when:

Method for Estimating CRT, ICD, and IPG Device Performance continued

(a) a device is returned with no associated complaint and the device has reached its elective replacement indicator(s) with implant time that meets or exceeds the nominal (50 percentile) predicted longevity at default (labeled) settings

Or

(b) a device is returned and the device has reached its elective replacement indicator(s) with implant time exceeding 80% of the expected longevity calculated using the available device setting information

Or

(c) a device is taken out of service without an associated complaint and with evidence the battery reached its elective replacement indicator(s).

Medtronic CRM establishes expected longevity by statistically characterizing the power consumed by the device and the power available from the device battery. This characterization is applied to a number of parameter configurations. The statistical mean value minus three standard deviations is used as the expected longevity for determining if a battery depleted normally. The actual longevity achieved for any device while implanted will depend on the actual programmed parameters and patient factors, and may differ significantly from these estimates.

Malfunction with Compromised Therapy Function

The condition when a device is found to have malfunctioned in a manner that compromised pacing or defibrillation therapy (including complete loss or partial degradation), while implanted and in service, as confirmed by returned product analysis.

Examples: Sudden loss of battery voltage; accelerated current drain such that low battery was not detected before loss of therapy; sudden malfunction during defibrillation therapy resulting in aborted delivery of therapy, intermittent malfunction where therapy is or may be compromised while in the malfunction state.

Malfunction without Compromised Therapy Function

The condition when a device is found to have malfunctioned in a manner that did not compromise pacing or defibrillation therapy, while implanted and in service, as confirmed by returned product analysis.

Examples: Error affecting diagnostic functions, telemetry function, data storage; malfunction of a component that causes battery to lose power quickly enough to cause premature battery depletion, but slowly enough that the condition is detected through normal follow-up before therapy is lost; mechanical problems with connector header that do not affect therapy.

Expanded Malfunction Detail

The malfunctions are further divided into categories that identify the subject area of the malfunction. The malfunctions are divided into the following subject areas:

Battery – Findings linked to the battery and its components

Device-Related Current Pathway – Findings confirmed through device or device memory returns linked to reduced or no energy shocks and other effects (e.g., 50% drop in daily pacing lead impedance measurements not due to a lead issue)

Electrical Component – Findings linked to electrical components such as integrated circuits, resistors, capacitors, diodes, etc.

Method for Estimating CRT, ICD, and IPG Device Performance continued

Electrical Interconnect – Findings linked to the connections between electrical components such as wires, solder joints, wire bonds, etc.

Possible Early Battery Depletion – Findings where the actual reported implant time is less than 80% of the expected longevity calculated using the available device setting information with no device malfunction observed. There may not be sufficient device setting information to determine conclusively if battery depletion was normal or premature in the absence of a specific root cause finding. However, returned devices meeting the above criteria are conservatively classified as Possible Early Battery Depletion malfunctions.

Software/Firmware – Findings linked to software or firmware function

Other – Findings related to other components such as insulators, grommets, setscrews, and packaging, and findings where analysis is inconclusive.

Returned Product Analysis Process

Analysis of returned product or device memory data is performed according to written procedures. These procedures determine the minimum analysis required. The analysis required varies depending on the type of device, age of the device, the associated information received with the device, actual experience with models of similar design, and other factors. Additional analysis is performed as necessary to investigate a performance concern from a customer, or to collect specific reliability data.

When a device is returned with a performance concern from a customer, the general analysis process includes a preliminary analysis of the device in its as-received condition, followed by an automated functional test using test equipment equivalent to the equipment used in manufacturing.

When a malfunction is identified, failure analysis is performed to provide the detailed information necessary to investigate possible causes and actions. Medtronic CRM maintains in-house expertise and performs its failure analysis using facilities it owns and supports. This capability permits detailed failure analysis.

Statistical Methods for Survival Analysis

Of the several different statistical methods available for survival analysis, the Standard Actuarial Method, with suspensions assumed distributed evenly within the intervals (Cutler-Ederer Method), is used to determine survival estimates for CRT, IPG and ICD devices. Implant times are calculated from the implant date to the earlier of the explant date or the cutoff date of the report. From this data an estimate of the probability of device survival is calculated at each monthly interval.

On the following pages, each graph includes a survival curve where events include malfunctions and normal battery depletions (labeled as "Including Normal Battery Depletion"). This survival curve is a good representation of the probability a device will survive a period of time without malfunction and without battery depletion. For example, if a device survival probability is 95% after 5 years of service, then the device has a 5% chance of being removed due to battery depletion or malfunction in the first 5 years following implant.

In addition, a second curve is included to show survival excluding normal battery depletion (labeled as "Excluding Normal Battery Depletion"). This curve is a good representation of the probability for a device to survive without malfunction. This curve includes only malfunctions as events and excludes normal battery depletion.

Since the survival estimate can become very imprecise with small effective sample sizes, Medtronic truncates the survival curve when the effective sample size is less than 100 for CRT, ICD, and IPG devices. The survival charts in the

Method for Estimating CRT, ICD, and IPG Device Performance continued

Product Performance Report show the effective sample size for each year interval where we have experience. When the effective sample size reaches 100, the next data point is added to the survival curve.

Although the report provides tabular data in one-year intervals, the curves are actually computed and plotted using one-month intervals.

The data in the tables are rounded to the nearest tenth of one percent. Occasionally, a graph may show 100% survival, but have one or more malfunctions or battery depletions. This occurs because, even with the malfunctions or battery depletions, the data rounds to 100%.

Sample Size and How the Population and Population Samples Are Defined

The population sample from which the survival estimates are derived is comprised of the devices registered as implanted in the United States as of the report cutoff date. The number of registered implants, as well as an estimate of the number that remain in active service, is listed for each model. To be included in the population, the device must have been registered with Medtronic's registration system and implanted for at least one day.

This sample based on US implants is considered to be representative of the worldwide population, and therefore the survival estimates shown in this report should be representative of the performance worldwide of these models.

A CRT, ICD, or IPG model or model family will be included in this report when it has accumulated at least 10,000 implant months and will remain in the report as long as at least 500 devices remain active.

Methods Used to Adjust for Underreporting of Malfunction and Battery Depletion

The tables on the following pages show the actual number of malfunctions and battery depletions recorded by the analysis lab for US registered devices. Since not all devices are returned to Medtronic CRM for analysis, these numbers underestimate the true number of malfunctions and battery depletions. To more accurately estimate the device survival probabilities, the number of malfunctions and battery depletions used to plot each interval of the "Including Normal Battery Depletion" survival curves is adjusted (multiplied) by a factor that is based on an estimate of the magnitude of underreporting. The magnitude of underreporting is estimated by comparing data in Medtronic's Device Registration Tracking Application (DTrak) with data from Returned Product Analysis.

The DTrak system is an important element of Medtronic's Quality System. The DTrak system is designed to meet or exceed the US FDA's device tracking requirements set forth by the Safe Medical Devices Act. In the United States, over 98% of Medtronic's CRT, ICD, and IPG implants become registered in the DTrak system.

Because pacemakers do not cure the patient's underlying health problem, when a pacemaker stops functioning (due to either normal battery replacement or malfunction) it is replaced with a new pacemaker. Therefore, the replacement recorded in the DTrak system is a good indication that the previous pacemaker experienced either battery depletion or malfunction. The fraction of replaced devices that are subsequently returned can be used to estimate the correction factor for the under reporting of the combination of battery depletion and malfunction.

Note that devices of patients who have expired do not factor into the calculation of the correction. It is possible some proportion of these devices experienced battery depletion or malfunction. Since these are not counted into the correction factor based on the return rate of replaced devices, a correction factor based only on the return rate of replaced devices may still underestimate the true rate of battery depletion and malfunction. However, devices that are replaced because the patient is receiving a system upgrade or are removed because the patient no longer needs it (e.g., due to heart transplant) do contribute to the calculation of the correction factor and therefore impart an opposite bias.

Also note that this method of calculating the correction factor cannot distinguish between devices that are removed due to malfunction and those due to normal battery depletion. It might seem intuitive that devices that unexpectedly malfunction should be much more likely to be returned to the manufacturer than a device with ordinary normal battery depletion. But this has not been conclusively demonstrated. Therefore, this method only provides a correction factor reflecting the combination of battery depletion and malfunction.

No adjustment for underreporting is applied to the malfunction-free survival curve because a method for estimating malfunction-only underreporting has not been developed.

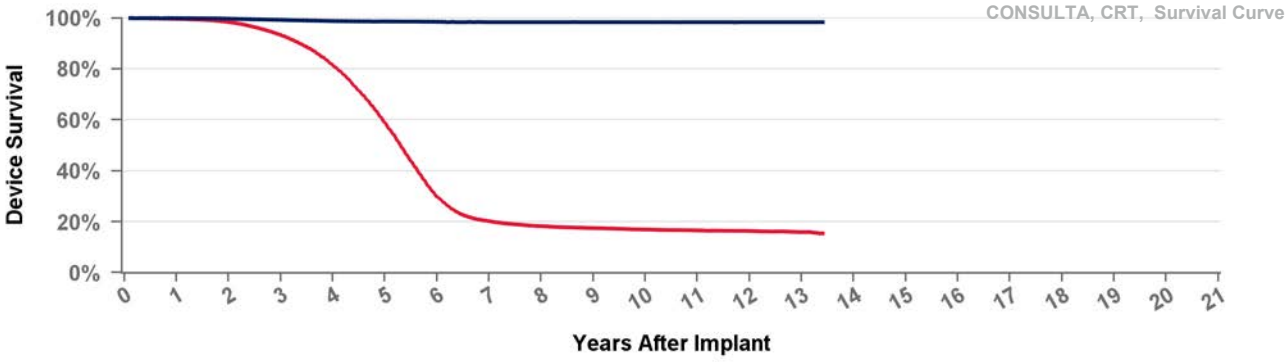
Adjustments to Registered Implants to Compensate for Unreported Devices Removed from Service

Devices are at times removed from service for reasons other than device malfunction or battery depletion. Examples are devices removed from service due to non-device related patient mortality and devices removed due to changes in the patient's medical condition. Because an accurate estimate of device survival depends on an accurate estimate of the number of devices in service, it is important not to overstate the number of devices in service.

Medtronic addresses this under reporting to ensure the number of devices in service is not overstated. Regular updates obtained from third party sources such as the Social Security Administration are used to update Medtronic's DTrak data about patients who have died but whose deaths had not been reported to Medtronic. In addition, the patient mortality rate derived from our DTrak system is monitored and compared to published mortality rates for comparable patient populations. If, during calculation of the survival curves, the patient mortality indicated by the data in DTrak is significantly different from published rates, an adjustment is applied to correct the difference. The correction factor is also applied to account for devices that were removed and not reported or returned.

D224TRK Consulta CRT-D

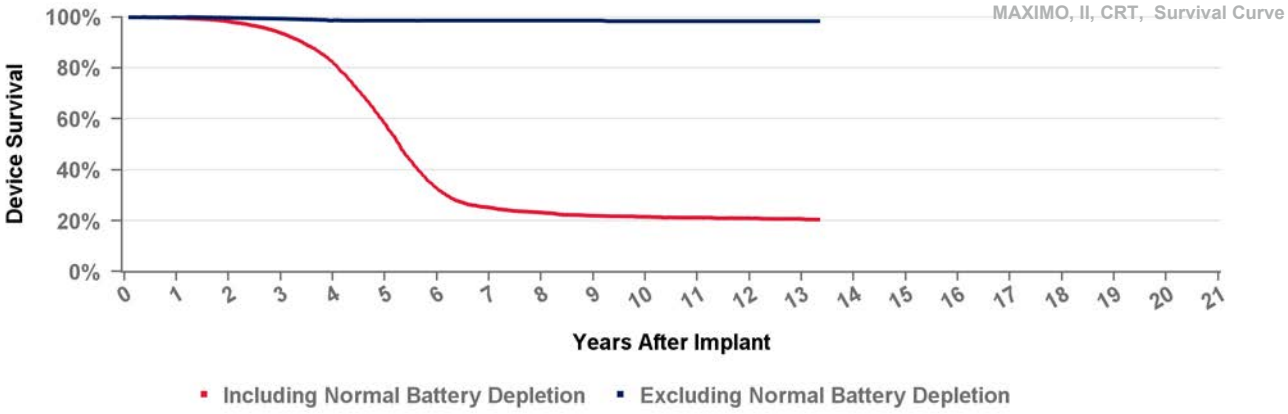
US Market Release	15Sep2008	**Total Malfunctions (USA)**	**604**
CE Approval Date		**Therapy Function Not Compromised**	**575**
Registered USA Implants	65,131	Battery	2
Estimated Active USA Implants	5,007	Electrical Component	69
Normal Battery Depletions	18,962	Electrical Interconnect	1
		Possible Early Battery Depletion	496
		Software/Firmware	6
		Other	1
		Therapy Function Compromised	**29**
		Battery	5
		Electrical Component	24



Years	1	2	3	4	5	6	7	8	9	10	11	12	13	at 161 mo
Excluding NBD	100.0%	99.7%	99.3%	98.8%	98.7%	98.5%	98.4%	98.4%	98.4%	98.4%	98.3%	98.3%	98.3%	98.3%
Including NBD	99.7%	98.4%	93.3%	81.4%	59.0%	29.9%	20.3%	18.3%	17.6%	17.0%	16.6%	16.4%	15.9%	15.5%
Effective Sample Size	56119	50208	42861	33048	19357	7459	4041	3291	2930	2683	2302	1651	781	103

D284TRK Maximo II CRT-D

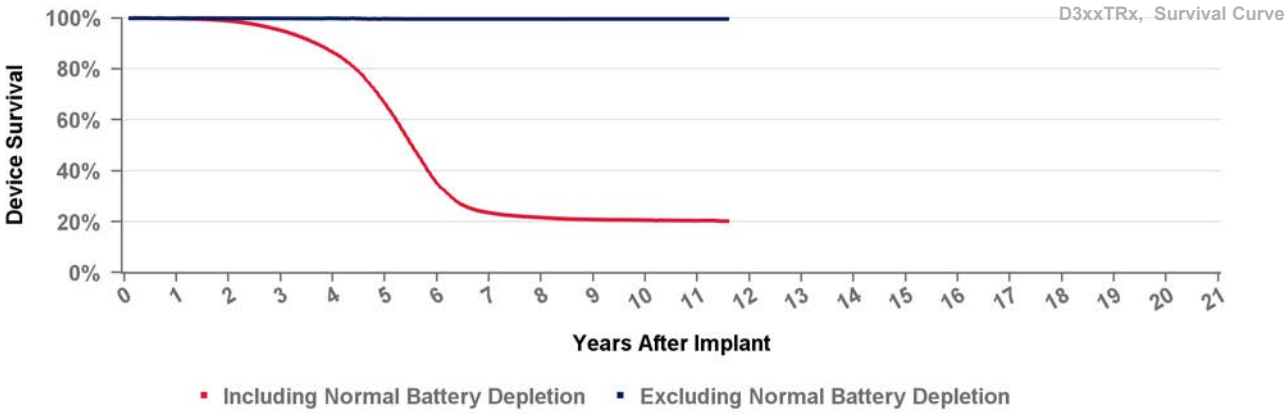
US Market Release	17Sep2008	**Total Malfunctions (USA)**	**135**
CE Approval Date	14Mar2008	**Therapy Function Not Compromised**	**130**
Registered USA Implants	14,990	Electrical Component	6
Estimated Active USA Implants	1,335	Possible Early Battery Depletion	124
Normal Battery Depletions	4,084	**Therapy Function Compromised**	**5**
		Electrical Component	5



Years	1	2	3	4	5	6	7	8	9	10	11	12	13	at 160 mo
Excluding NBD	100.0%	99.7%	99.3%	98.7%	98.6%	98.5%	98.5%	98.5%	98.5%	98.5%	98.5%	98.5%	98.5%	98.5%
Including NBD	99.7%	98.3%	93.7%	82.1%	58.3%	32.5%	25.2%	23.2%	22.0%	21.6%	21.2%	21.0%	20.7%	20.6%
Effective Sample Size	12499	11085	9498	7255	3991	1659	1089	913	800	742	651	469	205	113

D314TRG Protecta XT CRT-D

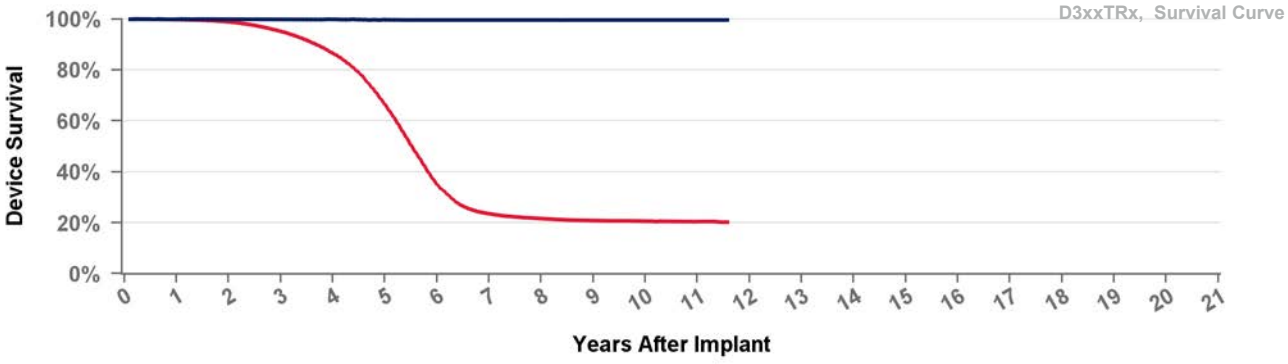
US Market Release	25Mar2011	**Total Malfunctions (USA)**	**94**
CE Approval Date		**Therapy Function Not Compromised**	**75**
Registered USA Implants	41,864	Battery	8
Estimated Active USA Implants	4,665	Electrical Component	40
Normal Battery Depletions	10,520	Possible Early Battery Depletion	25
		Other	2
		Therapy Function Compromised	**19**
		Battery	11
		Electrical Component	8



Years	1	2	3	4	5	6	7	8	9	10	11	at 139 mo
Excluding NBD	100.0%	99.9%	99.9%	99.8%	99.7%	99.6%	99.6%	99.6%	99.6%	99.6%	99.6%	99.6%
Including NBD	99.8%	98.9%	95.1%	86.5%	66.6%	35.2%	23.6%	21.7%	20.9%	20.7%	20.4%	20.2%
Effective Sample Size	54158	48931	42283	33508	21043	8884	4864	4021	3607	3259	1977	168

D354TRG Protecta XT CRT-D

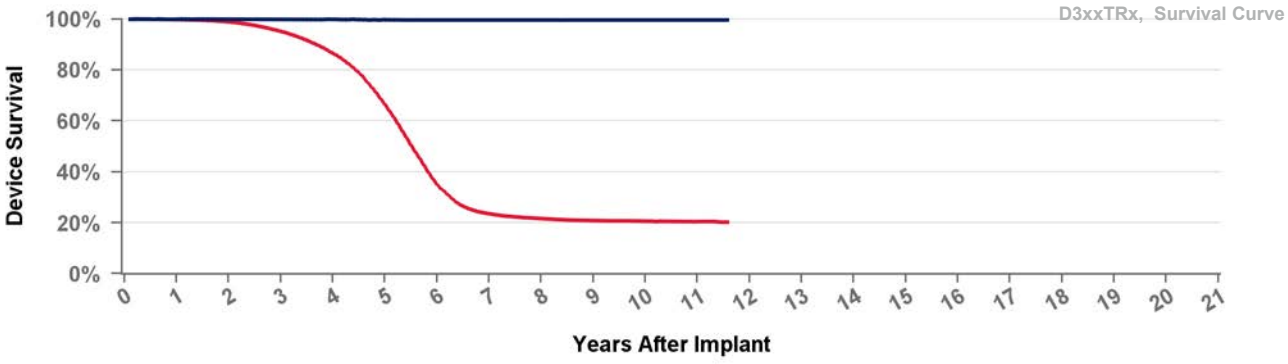
US Market Release		**Total Malfunctions (USA)**	
CE Approval Date	25Mar2010	**Therapy Function Not Compromised**	
Registered USA Implants	1		
Estimated Active USA Implants		**Therapy Function Compromised**	
Normal Battery Depletions			



Years	1	2	3	4	5	6	7	8	9	10	11	at 139 mo
Excluding NBD	100.0%	99.9%	99.9%	99.8%	99.7%	99.6%	99.6%	99.6%	99.6%	99.6%	99.6%	99.6%
Including NBD	99.8%	98.9%	95.1%	86.5%	66.6%	35.2%	23.6%	21.7%	20.9%	20.7%	20.4%	20.2%
Effective Sample Size	54158	48931	42283	33508	21043	8884	4864	4021	3607	3259	1977	168

D354TRM Protecta XT CRT-D

US Market Release		**Total Malfunctions (USA)**	
CE Approval Date	15Jul2010	**Therapy Function Not Compromised**	
Registered USA Implants			
Estimated Active USA Implants		**Therapy Function Compromised**	
Normal Battery Depletions			



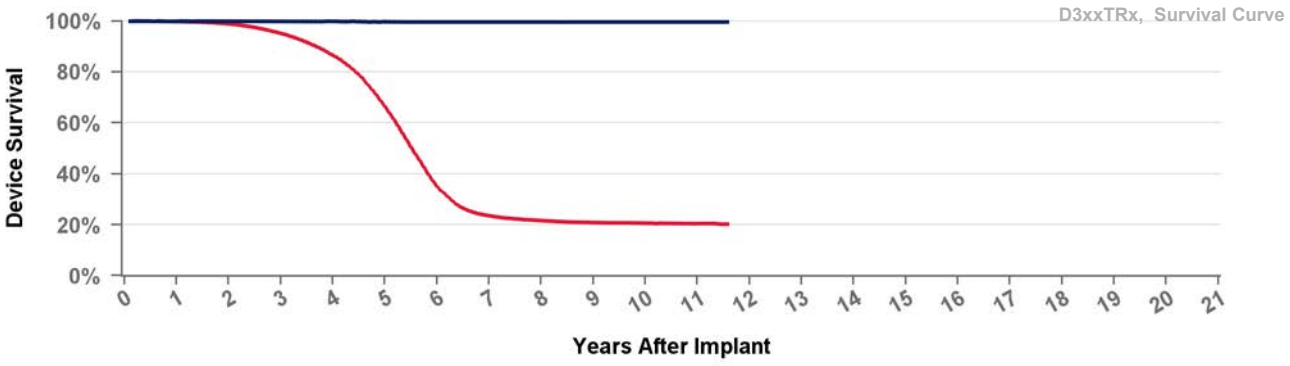
Years	1	2	3	4	5	6	7	8	9	10	11	at 139 mo
Excluding NBD	100.0%	99.9%	99.9%	99.8%	99.7%	99.6%	99.6%	99.6%	99.6%	99.6%	99.6%	99.6%
Including NBD	99.8%	98.9%	95.1%	86.5%	66.6%	35.2%	23.6%	21.7%	20.9%	20.7%	20.4%	20.2%
Effective Sample Size	54158	48931	42283	33508	21043	8884	4864	4021	3607	3259	1977	168

D364TRG Protecta CRT-D

US Market Release
CE Approval Date 25Mar2010
Registered USA Implants
Estimated Active USA Implants
Normal Battery Depletions

Total Malfunctions (USA)
Therapy Function Not Compromised

Therapy Function Compromised



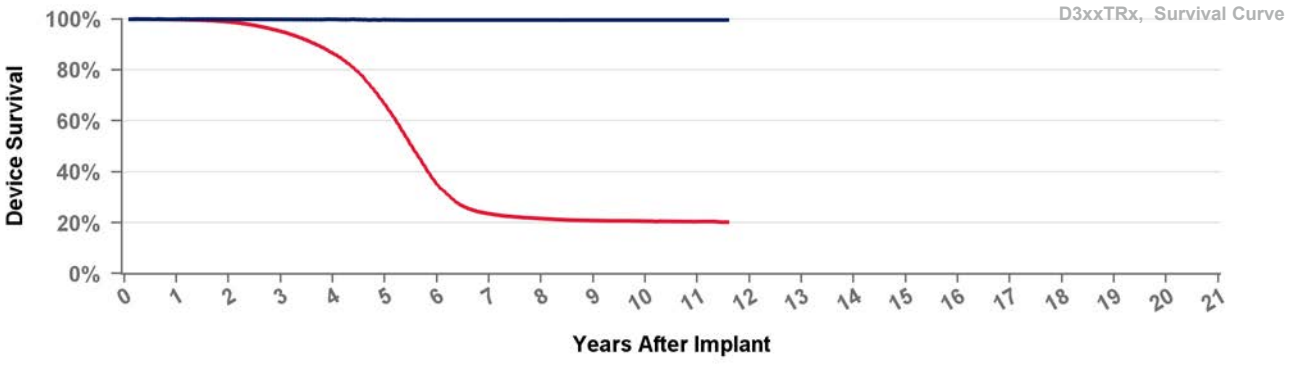
Years	1	2	3	4	5	6	7	8	9	10	11	at 139 mo
Excluding NBD	100.0%	99.9%	99.9%	99.8%	99.7%	99.6%	99.6%	99.6%	99.6%	99.6%	99.6%	99.6%
Including NBD	99.8%	98.9%	95.1%	86.5%	66.6%	35.2%	23.6%	21.7%	20.9%	20.7%	20.4%	20.2%
Effective Sample Size	54158	48931	42283	33508	21043	8884	4864	4021	3607	3259	1977	168

D364TRM Protecta CRT-D

US Market Release
CE Approval Date 15Jul2010
Registered USA Implants
Estimated Active USA Implants
Normal Battery Depletions

Total Malfunctions (USA)
Therapy Function Not Compromised

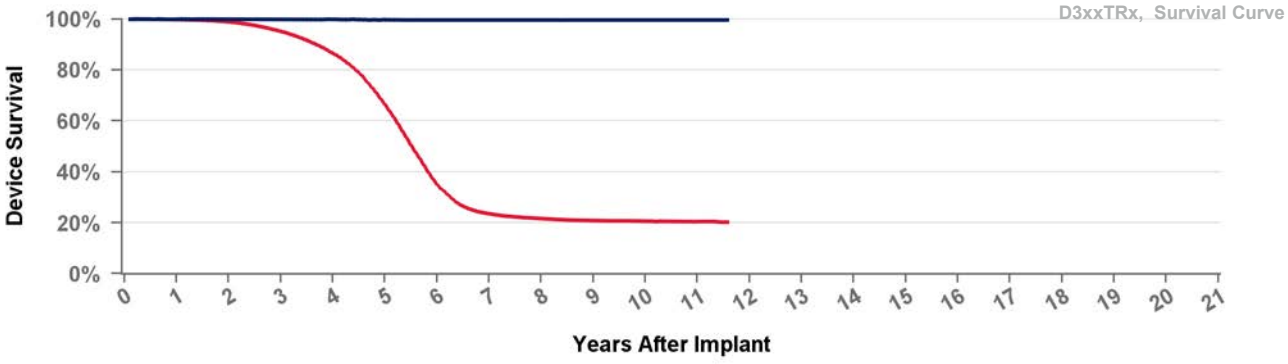
Therapy Function Compromised



Years	1	2	3	4	5	6	7	8	9	10	11	at 139 mo
Excluding NBD	100.0%	99.9%	99.9%	99.8%	99.7%	99.6%	99.6%	99.6%	99.6%	99.6%	99.6%	99.6%
Including NBD	99.8%	98.9%	95.1%	86.5%	66.6%	35.2%	23.6%	21.7%	20.9%	20.7%	20.4%	20.2%
Effective Sample Size	54158	48931	42283	33508	21043	8884	4864	4021	3607	3259	1977	168

D394TRG Egida CRT-D

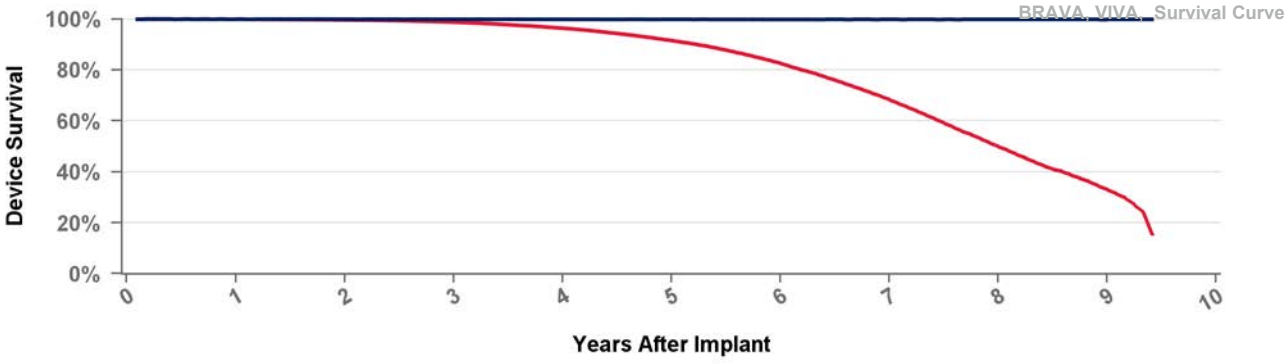
US Market Release		**Total Malfunctions (USA)**	
CE Approval Date	12Jan2011	**Therapy Function Not Compromised**	
Registered USA Implants			
Estimated Active USA Implants		**Therapy Function Compromised**	
Normal Battery Depletions			



Years	1	2	3	4	5	6	7	8	9	10	11	at 139 mo
Excluding NBD	100.0%	99.9%	99.9%	99.8%	99.7%	99.6%	99.6%	99.6%	99.6%	99.6%	99.6%	99.6%
Including NBD	99.8%	98.9%	95.1%	86.5%	66.6%	35.2%	23.6%	21.7%	20.9%	20.7%	20.4%	20.2%
Effective Sample Size	54158	48931	42283	33508	21043	8884	4864	4021	3607	3259	1977	168

DTBA1D1 Viva XT

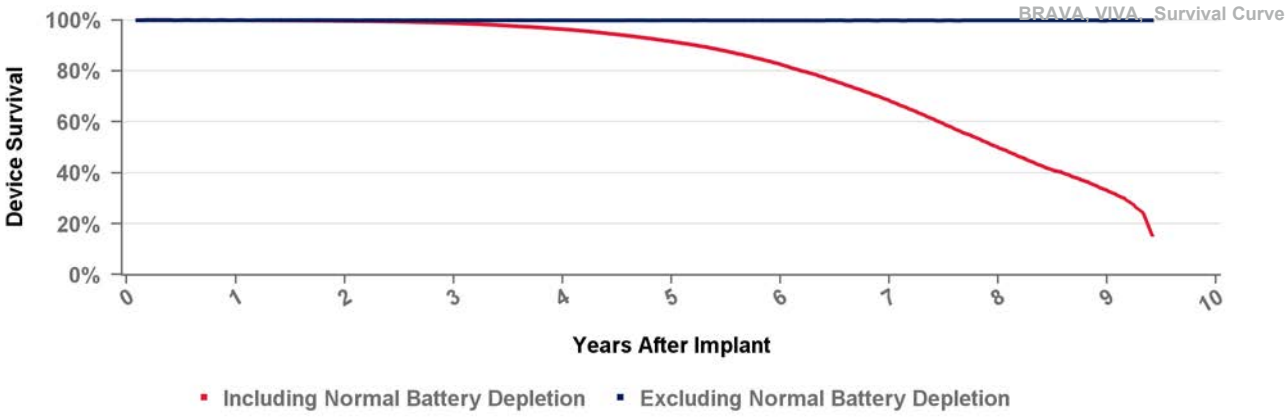
US Market Release	29Jan2013	**Total Malfunctions (USA)**	**71**
CE Approval Date		**Therapy Function Not Compromised**	**46**
Registered USA Implants	110,563	Battery	10
Estimated Active USA Implants	28,918	Electrical Component	32
Normal Battery Depletions	14,782	Possible Early Battery Depletion	1
		Other	3
		Therapy Function Compromised	**25**
		Battery	19
		Device-Related Current Pathway	2
		Electrical Component	4



Years	1	2	3	4	5	6	7	8	9	at 113 mo
Excluding NBD	100.0%	100.0%	99.9%	99.9%	99.9%	99.8%	99.8%	99.8%	99.8%	99.8%
Including NBD	99.9%	99.7%	98.8%	96.4%	91.6%	82.6%	68.3%	49.9%	33.0%	15.6%
Effective Sample Size	86427	78571	71233	62988	53101	41389	27023	11762	2422	126

DTBA1D4 Viva XT

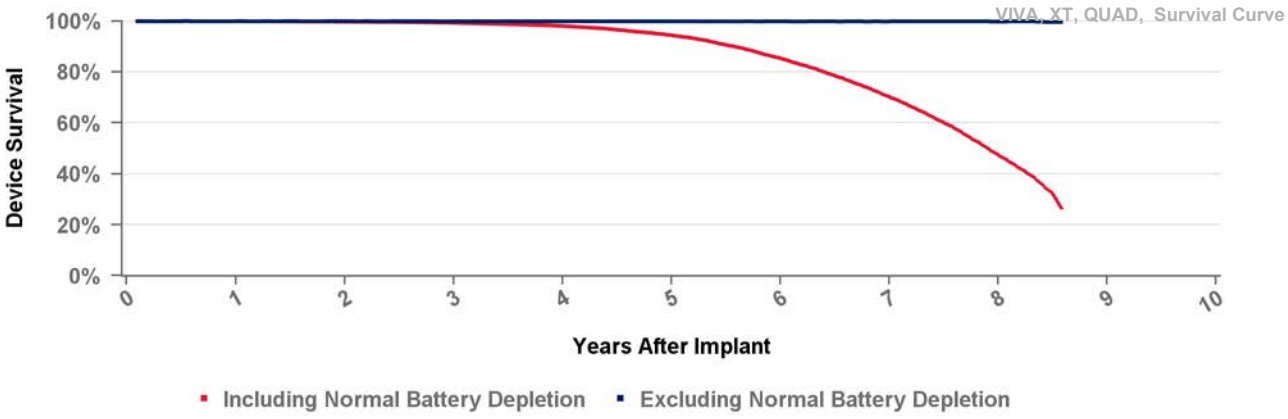
US Market Release	29Jan2013	**Total Malfunctions (USA)**	**33**
CE Approval Date		**Therapy Function Not Compromised**	**24**
Registered USA Implants	37,782	Battery	6
Estimated Active USA Implants	9,185	Electrical Component	15
Normal Battery Depletions	6,427	Possible Early Battery Depletion	3
		Therapy Function Compromised	**9**
		Battery	6
		Electrical Component	3



Years	1	2	3	4	5	6	7	8	9	at 113 mo
Excluding NBD	100.0%	100.0%	99.9%	99.9%	99.9%	99.8%	99.8%	99.8%	99.8%	99.8%
Including NBD	99.9%	99.7%	98.8%	96.4%	91.6%	82.6%	68.3%	49.9%	33.0%	15.6%
Effective Sample Size	86427	78571	71233	62988	53101	41389	27023	11762	2422	126

DTBA1Q1 Viva Quad XT

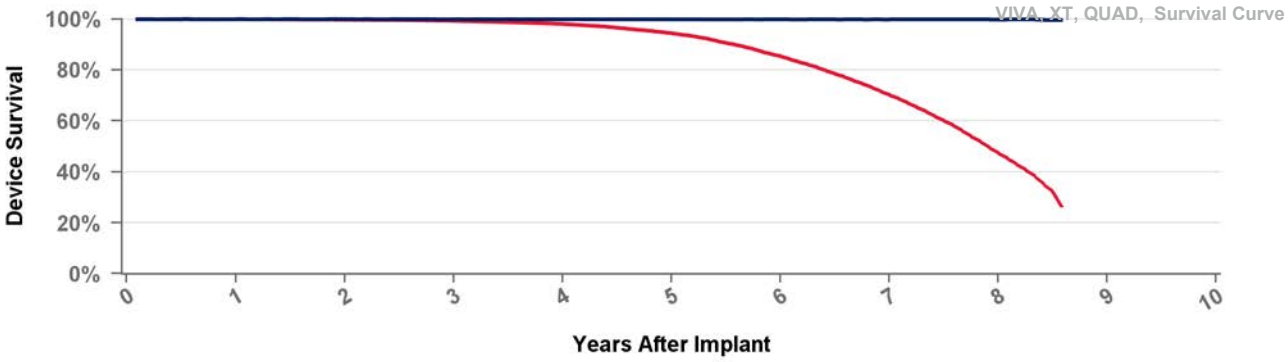
US Market Release	03Jul2014	**Total Malfunctions (USA)**	**14**
CE Approval Date		**Therapy Function Not Compromised**	**9**
Registered USA Implants	21,350	Battery	3
Estimated Active USA Implants	6,175	Electrical Component	4
Normal Battery Depletions	2,765	Possible Early Battery Depletion	1
		Other	1
		Therapy Function Compromised	**5**
		Battery	4
		Electrical Component	1



Years	1	2	3	4	5	6	7	8	at 103 mo
Excluding NBD	100.0%	100.0%	99.9%	99.9%	99.9%	99.8%	99.8%	99.8%	99.8%
Including NBD	99.9%	99.8%	99.3%	98.1%	94.4%	85.4%	70.2%	47.4%	26.7%
Effective Sample Size	33771	31343	28906	25963	22291	17429	11584	4607	474

DTBA1QQ Viva Quad XT

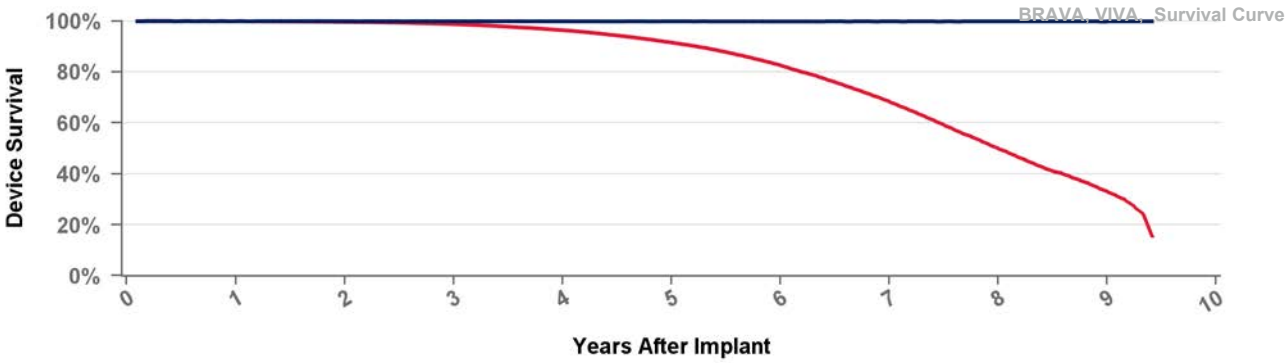
US Market Release	03Jul2014	**Total Malfunctions (USA)**	**49**
CE Approval Date		**Therapy Function Not Compromised**	**37**
Registered USA Implants	53,407	Battery	12
Estimated Active USA Implants	16,066	Electrical Component	20
Normal Battery Depletions	8,393	Electrical Interconnect	1
		Possible Early Battery Depletion	3
		Other	1
		Therapy Function Compromised	**12**
		Battery	9
		Electrical Component	3



Years	1	2	3	4	5	6	7	8	at 103 mo
Excluding NBD	100.0%	100.0%	99.9%	99.9%	99.9%	99.8%	99.8%	99.8%	99.8%
Including NBD	99.9%	99.8%	99.3%	98.1%	94.4%	85.4%	70.2%	47.4%	26.7%
Effective Sample Size	33771	31343	28906	25963	22291	17429	11584	4607	474

DTBA2D1 Viva XT

US Market Release		**Total Malfunctions (USA)**	
CE Approval Date	29Aug2016	**Therapy Function Not Compromised**	
Registered USA Implants			
Estimated Active USA Implants		**Therapy Function Compromised**	
Normal Battery Depletions			

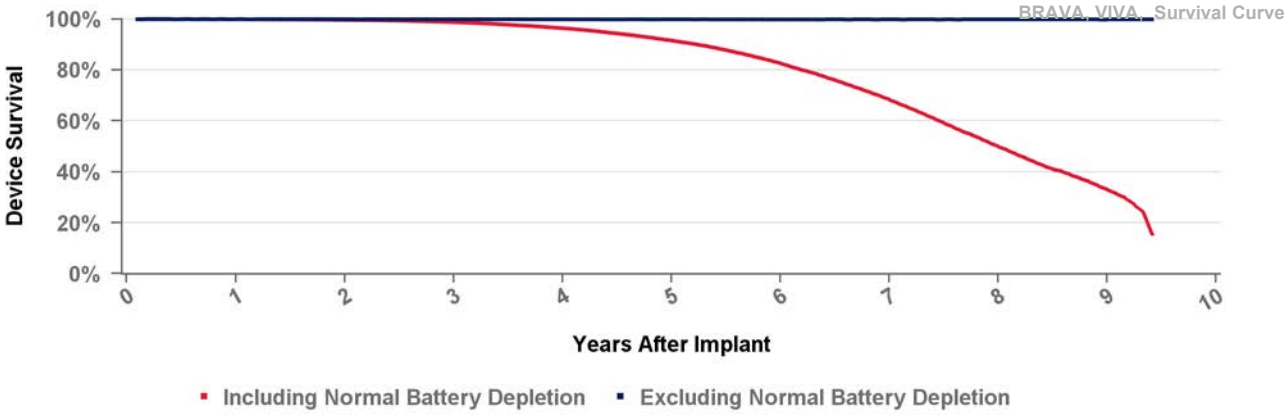


Years	1	2	3	4	5	6	7	8	9	at 113 mo
Excluding NBD	100.0%	100.0%	99.9%	99.9%	99.9%	99.8%	99.8%	99.8%	99.8%	99.8%
Including NBD	99.9%	99.7%	98.8%	96.4%	91.6%	82.6%	68.3%	49.9%	33.0%	15.6%
Effective Sample Size	86427	78571	71233	62988	53101	41389	27023	11762	2422	126

DTBA2D4 Viva XT

US Market Release
CE Approval Date 08Aug2012
Registered USA Implants
Estimated Active USA Implants
Normal Battery Depletions

Total Malfunctions (USA)
Therapy Function Not Compromised
Therapy Function Compromised

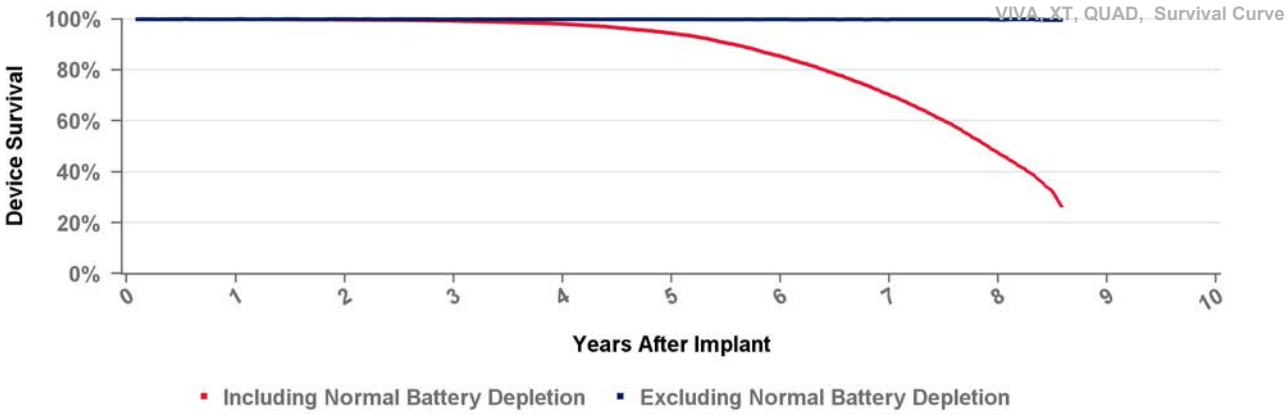


Years	1	2	3	4	5	6	7	8	9	at 113 mo
Excluding NBD	100.0%	100.0%	99.9%	99.9%	99.9%	99.8%	99.8%	99.8%	99.8%	99.8%
Including NBD	99.9%	99.7%	98.8%	96.4%	91.6%	82.6%	68.3%	49.9%	33.0%	15.6%
Effective Sample Size	86427	78571	71233	62988	53101	41389	27023	11762	2422	126

DTBA2Q1 Viva Quad XT

US Market Release
CE Approval Date 12Sep2013
Registered USA Implants
Estimated Active USA Implants
Normal Battery Depletions

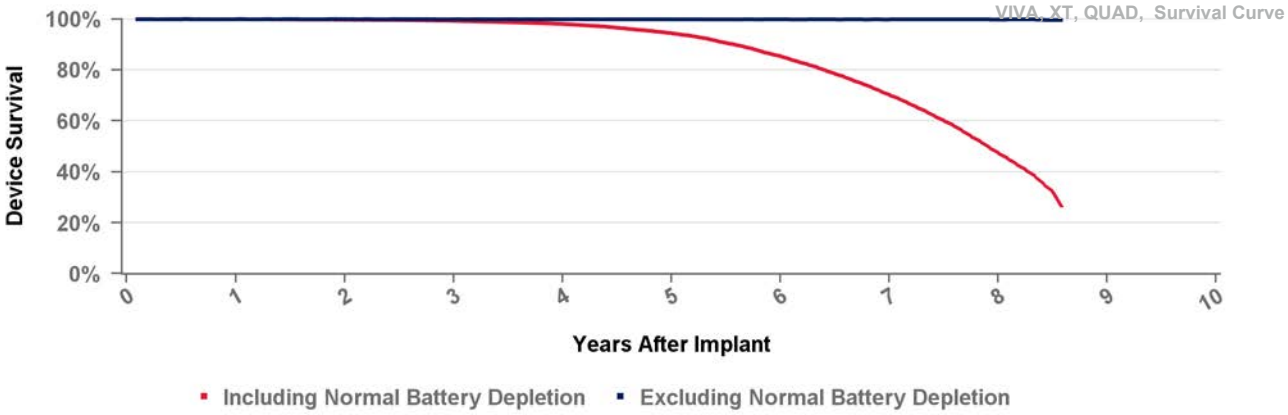
Total Malfunctions (USA)
Therapy Function Not Compromised
Therapy Function Compromised



Years	1	2	3	4	5	6	7	8	at 103 mo
Excluding NBD	100.0%	100.0%	99.9%	99.9%	99.9%	99.8%	99.8%	99.8%	99.8%
Including NBD	99.9%	99.8%	99.3%	98.1%	94.4%	85.4%	70.2%	47.4%	26.7%
Effective Sample Size	33771	31343	28906	25963	22291	17429	11584	4607	474

DTBA2QQ Viva Quad XT

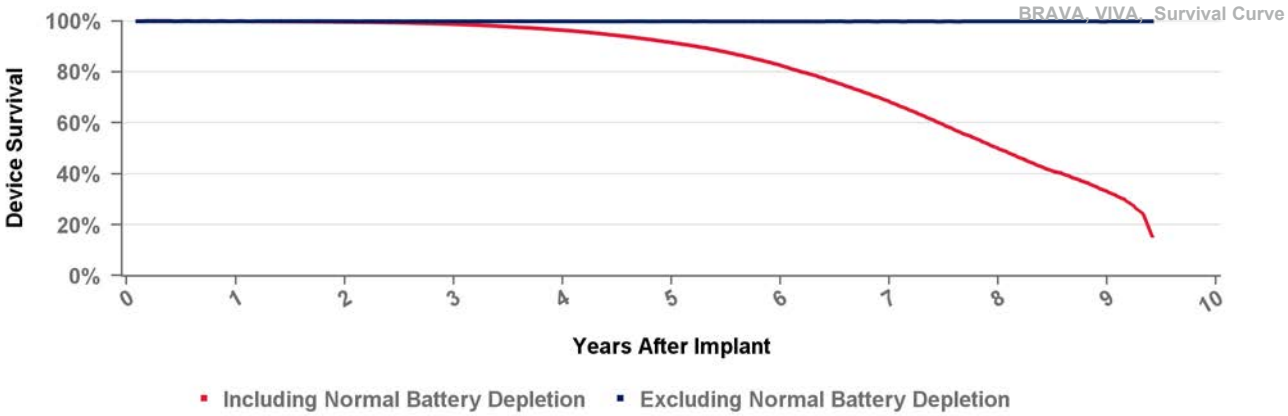
US Market Release		**Total Malfunctions (USA)**	
CE Approval Date	08Aug2012	**Therapy Function Not Compromised**	
Registered USA Implants			
Estimated Active USA Implants		**Therapy Function Compromised**	
Normal Battery Depletions			



Years	1	2	3	4	5	6	7	8	at 103 mo
Excluding NBD	100.0%	100.0%	99.9%	99.9%	99.9%	99.8%	99.8%	99.8%	99.8%
Including NBD	99.9%	99.8%	99.3%	98.1%	94.4%	85.4%	70.2%	47.4%	26.7%
Effective Sample Size	33771	31343	28906	25963	22291	17429	11584	4607	474

DTBB1D1 Viva S

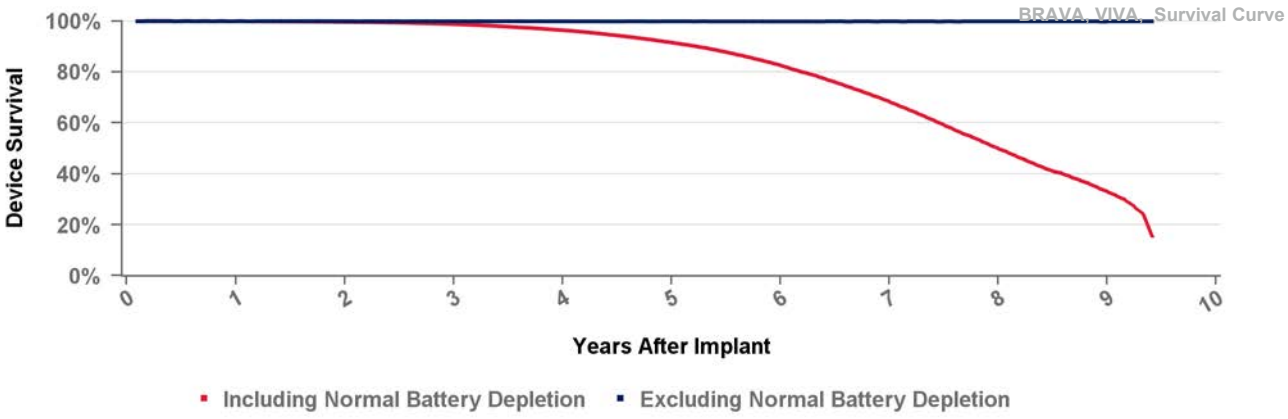
US Market Release	29Jan2013	**Total Malfunctions (USA)**	**23**
CE Approval Date		**Therapy Function Not Compromised**	**18**
Registered USA Implants	27,550	Battery	9
Estimated Active USA Implants	5,937	Electrical Component	6
Normal Battery Depletions	4,563	Possible Early Battery Depletion	2
		Other	1
		Therapy Function Compromised	**5**
		Battery	4
		Electrical Component	1



Years	1	2	3	4	5	6	7	8	9	at 113 mo
Excluding NBD	100.0%	100.0%	99.9%	99.9%	99.9%	99.8%	99.8%	99.8%	99.8%	99.8%
Including NBD	99.9%	99.7%	98.8%	96.4%	91.6%	82.6%	68.3%	49.9%	33.0%	15.6%
Effective Sample Size	86427	78571	71233	62988	53101	41389	27023	11762	2422	126

DTBB1D4 Viva S

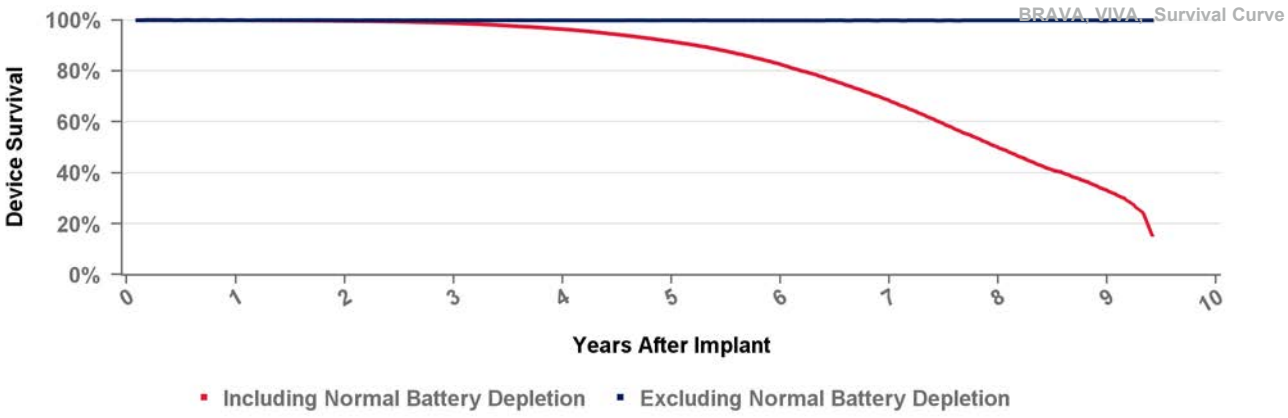
US Market Release	29Jan2013	**Total Malfunctions (USA)**	**9**
CE Approval Date		**Therapy Function Not Compromised**	**6**
Registered USA Implants	8,836	Battery	3
Estimated Active USA Implants	2,002	Electrical Component	2
Normal Battery Depletions	1,582	Other	1
		Therapy Function Compromised	**3**
		Battery	3



Years	1	2	3	4	5	6	7	8	9	at 113 mo
Excluding NBD	100.0%	100.0%	99.9%	99.9%	99.9%	99.8%	99.8%	99.8%	99.8%	99.8%
Including NBD	99.9%	99.7%	98.8%	96.4%	91.6%	82.6%	68.3%	49.9%	33.0%	15.6%
Effective Sample Size	86427	78571	71233	62988	53101	41389	27023	11762	2422	126

DTBB1Q1 Viva Quad S

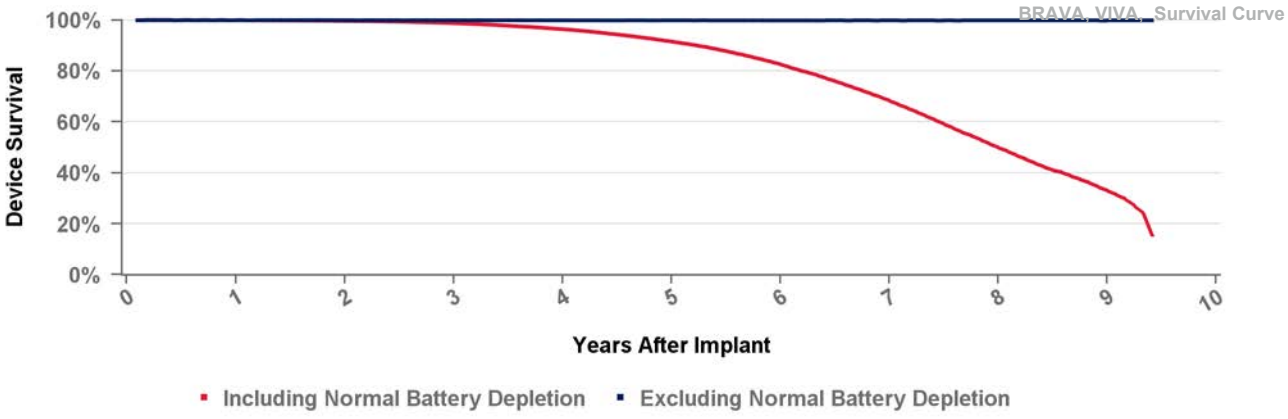
US Market Release	03Jul2014	**Total Malfunctions (USA)**	**2**
CE Approval Date		**Therapy Function Not Compromised**	**2**
Registered USA Implants	4,539	Battery	1
Estimated Active USA Implants	1,251	Electrical Component	1
Normal Battery Depletions	743	**Therapy Function Compromised**	**0**



Years	1	2	3	4	5	6	7	8	9	at 113 mo
Excluding NBD	100.0%	100.0%	99.9%	99.9%	99.9%	99.8%	99.8%	99.8%	99.8%	99.8%
Including NBD	99.9%	99.7%	98.8%	96.4%	91.6%	82.6%	68.3%	49.9%	33.0%	15.6%
Effective Sample Size	86427	78571	71233	62988	53101	41389	27023	11762	2422	126

DTBB1QQ Viva Quad S

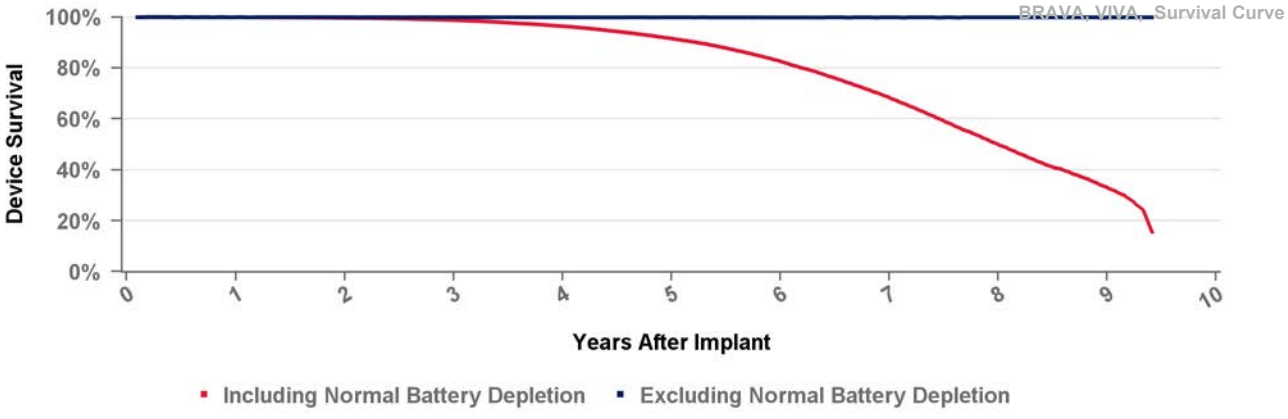
US Market Release	03Jul2014	**Total Malfunctions (USA)**	**9**
CE Approval Date		**Therapy Function Not Compromised**	**7**
Registered USA Implants	9,869	Battery	1
Estimated Active USA Implants	2,790	Electrical Component	3
Normal Battery Depletions	1,869	Possible Early Battery Depletion	2
		Other	1
		Therapy Function Compromised	**2**
		Electrical Component	2



Years	1	2	3	4	5	6	7	8	9	at 113 mo
Excluding NBD	100.0%	100.0%	99.9%	99.9%	99.9%	99.8%	99.8%	99.8%	99.8%	99.8%
Including NBD	99.9%	99.7%	98.8%	96.4%	91.6%	82.6%	68.3%	49.9%	33.0%	15.6%
Effective Sample Size	86427	78571	71233	62988	53101	41389	27023	11762	2422	126

DTBB2D1 Viva S

US Market Release		**Total Malfunctions (USA)**	
CE Approval Date	08Aug2012	**Therapy Function Not Compromised**	
Registered USA Implants			
Estimated Active USA Implants		**Therapy Function Compromised**	
Normal Battery Depletions			



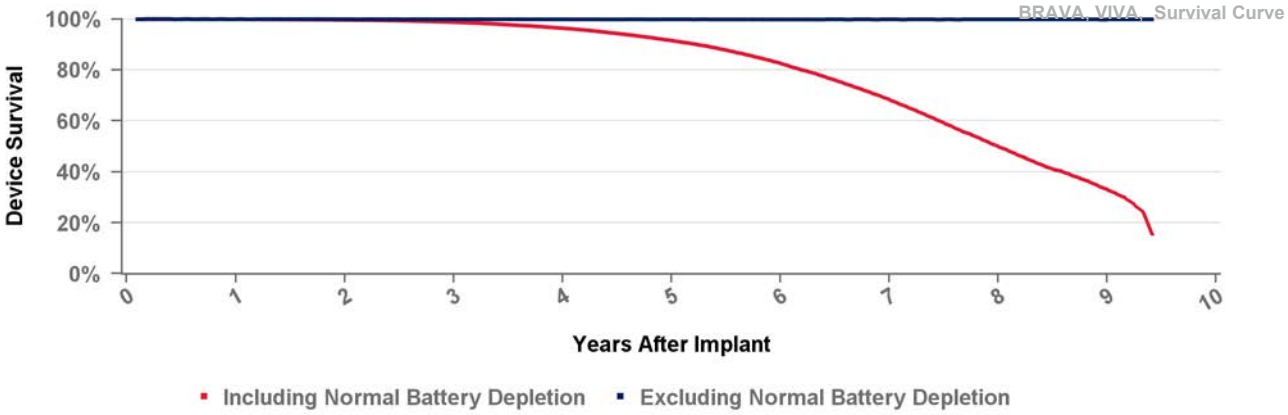
Years	1	2	3	4	5	6	7	8	9	at 113 mo
Excluding NBD	100.0%	100.0%	99.9%	99.9%	99.9%	99.8%	99.8%	99.8%	99.8%	99.8%
Including NBD	99.9%	99.7%	98.8%	96.4%	91.6%	82.6%	68.3%	49.9%	33.0%	15.6%
Effective Sample Size	86427	78571	71233	62988	53101	41389	27023	11762	2422	126

DTBB2D4 Viva S

US Market Release
CE Approval Date 08Aug2012
Registered USA Implants
Estimated Active USA Implants
Normal Battery Depletions

Total Malfunctions (USA)
Therapy Function Not Compromised

Therapy Function Compromised



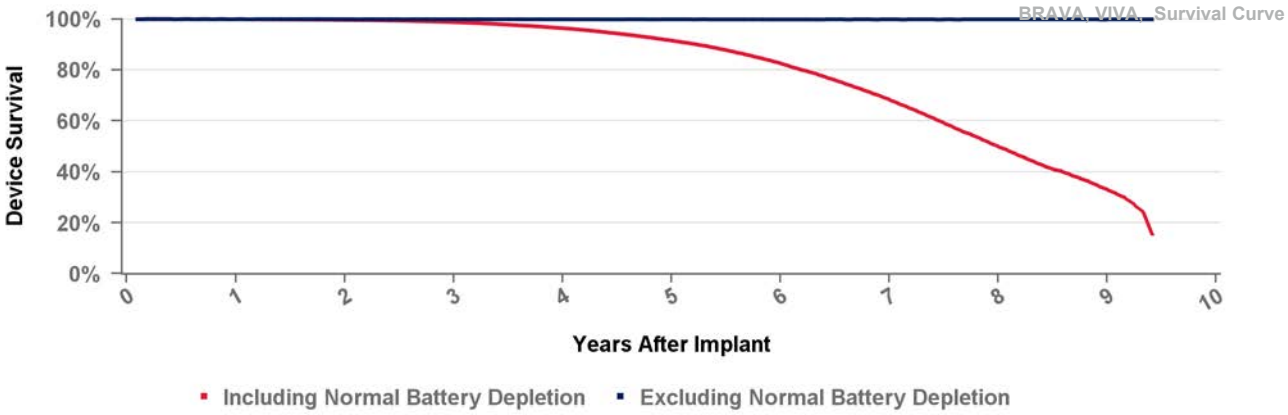
Years	1	2	3	4	5	6	7	8	9	at 113 mo
Excluding NBD	100.0%	100.0%	99.9%	99.9%	99.9%	99.8%	99.8%	99.8%	99.8%	99.8%
Including NBD	99.9%	99.7%	98.8%	96.4%	91.6%	82.6%	68.3%	49.9%	33.0%	15.6%
Effective Sample Size	86427	78571	71233	62988	53101	41389	27023	11762	2422	126

DTBB2QQ Viva Quad S

US Market Release
CE Approval Date 08Aug2012
Registered USA Implants
Estimated Active USA Implants
Normal Battery Depletions

Total Malfunctions (USA)
Therapy Function Not Compromised

Therapy Function Compromised



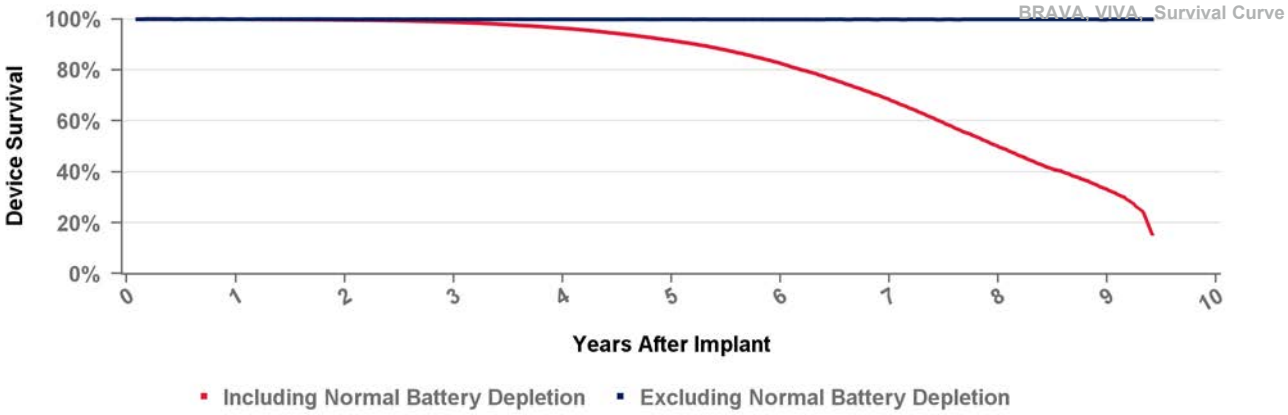
Years	1	2	3	4	5	6	7	8	9	at 113 mo
Excluding NBD	100.0%	100.0%	99.9%	99.9%	99.9%	99.8%	99.8%	99.8%	99.8%	99.8%
Including NBD	99.9%	99.7%	98.8%	96.4%	91.6%	82.6%	68.3%	49.9%	33.0%	15.6%
Effective Sample Size	86427	78571	71233	62988	53101	41389	27023	11762	2422	126

DTBC2D1 Brava

US Market Release
CE Approval Date 08Aug2012
Registered USA Implants
Estimated Active USA Implants
Normal Battery Depletions

Total Malfunctions (USA)
Therapy Function Not Compromised

Therapy Function Compromised



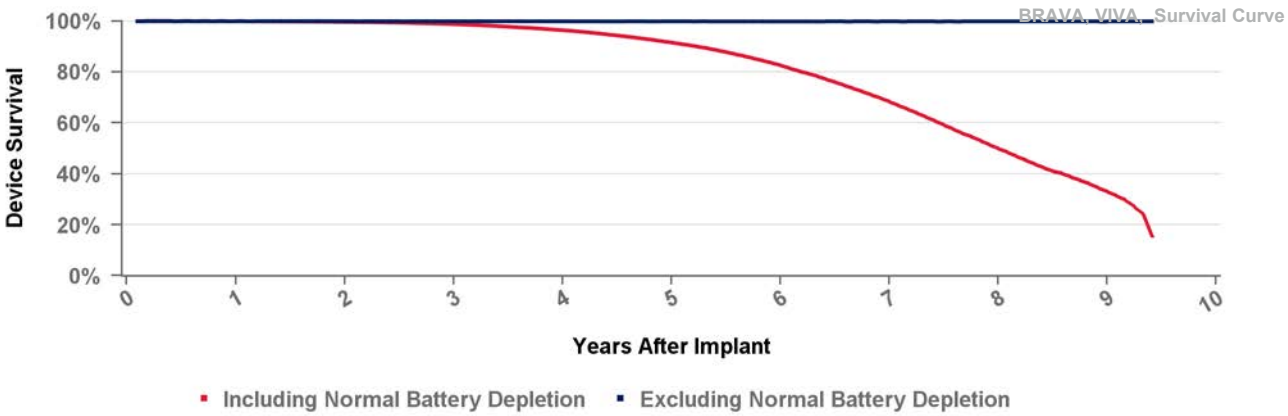
Years	1	2	3	4	5	6	7	8	9	at 113 mo
Excluding NBD	100.0%	100.0%	99.9%	99.9%	99.9%	99.8%	99.8%	99.8%	99.8%	99.8%
Including NBD	99.9%	99.7%	98.8%	96.4%	91.6%	82.6%	68.3%	49.9%	33.0%	15.6%
Effective Sample Size	86427	78571	71233	62988	53101	41389	27023	11762	2422	126

DTBC2D4 Brava

US Market Release
CE Approval Date 08Aug2012
Registered USA Implants
Estimated Active USA Implants
Normal Battery Depletions

Total Malfunctions (USA)
Therapy Function Not Compromised

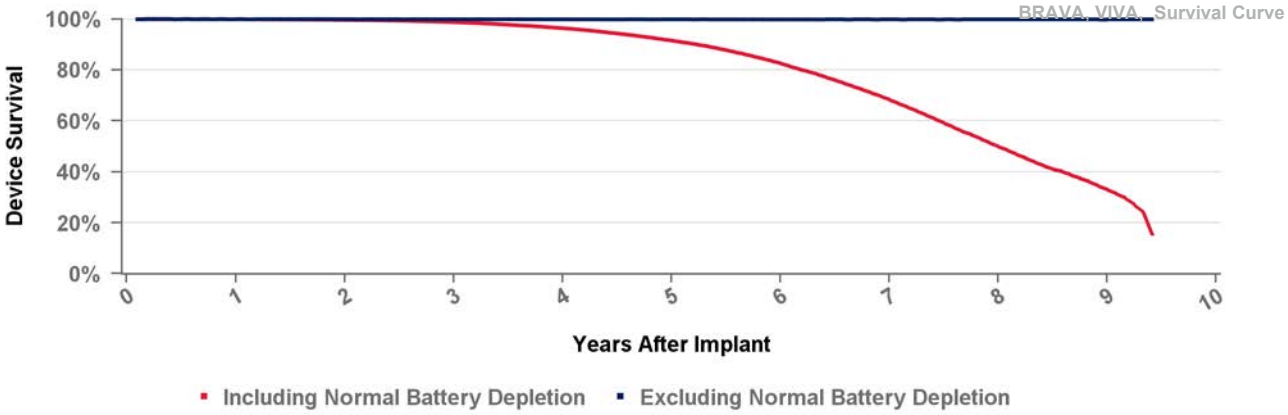
Therapy Function Compromised



Years	1	2	3	4	5	6	7	8	9	at 113 mo
Excluding NBD	100.0%	100.0%	99.9%	99.9%	99.9%	99.8%	99.8%	99.8%	99.8%	99.8%
Including NBD	99.9%	99.7%	98.8%	96.4%	91.6%	82.6%	68.3%	49.9%	33.0%	15.6%
Effective Sample Size	86427	78571	71233	62988	53101	41389	27023	11762	2422	126

DTBC2Q1 Brava Quad

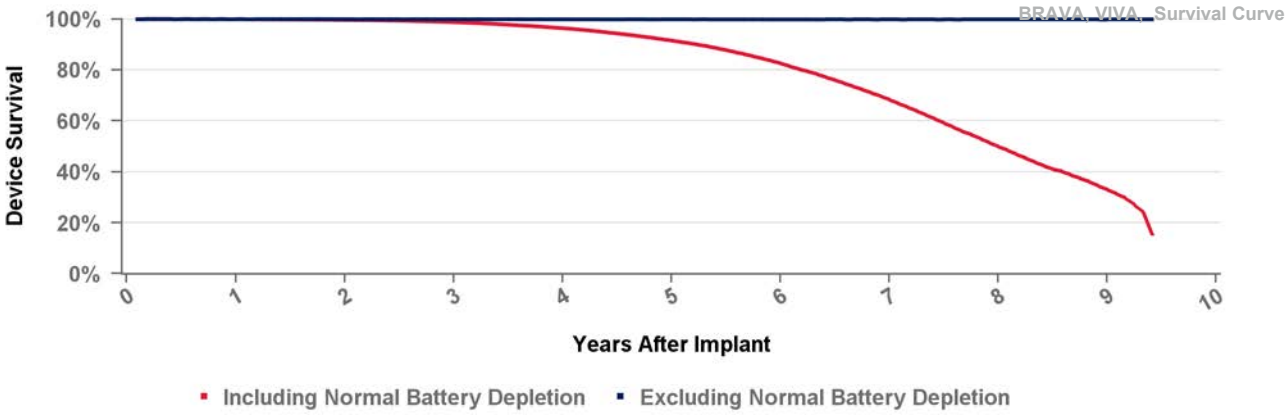
US Market Release		**Total Malfunctions (USA)**	
CE Approval Date	12Sep2013	**Therapy Function Not Compromised**	
Registered USA Implants			
Estimated Active USA Implants		**Therapy Function Compromised**	
Normal Battery Depletions			



Years	1	2	3	4	5	6	7	8	9	at 113 mo
Excluding NBD	100.0%	100.0%	99.9%	99.9%	99.9%	99.8%	99.8%	99.8%	99.8%	99.8%
Including NBD	99.9%	99.7%	98.8%	96.4%	91.6%	82.6%	68.3%	49.9%	33.0%	15.6%
Effective Sample Size	86427	78571	71233	62988	53101	41389	27023	11762	2422	126

DTBC2QQ Brava Quad

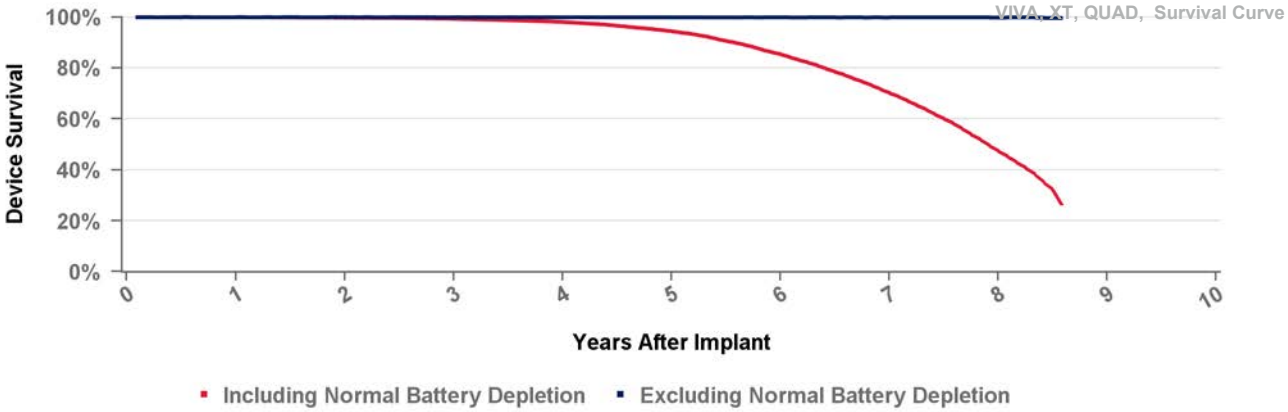
US Market Release		**Total Malfunctions (USA)**	
CE Approval Date	08Aug2012	**Therapy Function Not Compromised**	
Registered USA Implants	2		
Estimated Active USA Implants		**Therapy Function Compromised**	
Normal Battery Depletions			



Years	1	2	3	4	5	6	7	8	9	at 113 mo
Excluding NBD	100.0%	100.0%	99.9%	99.9%	99.9%	99.8%	99.8%	99.8%	99.8%	99.8%
Including NBD	99.9%	99.7%	98.8%	96.4%	91.6%	82.6%	68.3%	49.9%	33.0%	15.6%
Effective Sample Size	86427	78571	71233	62988	53101	41389	27023	11762	2422	126

DTBX1QQ Viva Quad C

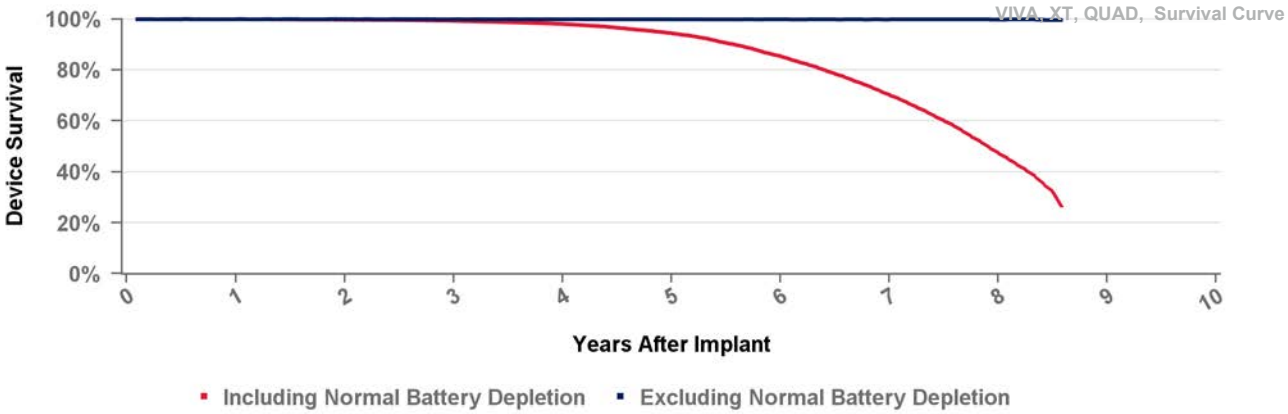
US Market Release	03Jul2014	**Total Malfunctions (USA)**	**1**
CE Approval Date		**Therapy Function Not Compromised**	**1**
Registered USA Implants	1,276	Electrical Component	1
Estimated Active USA Implants	144	**Therapy Function Compromised**	**0**
Normal Battery Depletions	382		



Years	1	2	3	4	5	6	7	8	at 103 mo
Excluding NBD	100.0%	100.0%	99.9%	99.9%	99.9%	99.8%	99.8%	99.8%	99.8%
Including NBD	99.9%	99.8%	99.3%	98.1%	94.4%	85.4%	70.2%	47.4%	26.7%
Effective Sample Size	33771	31343	28906	25963	22291	17429	11584	4607	474

DTBX2QQ Viva Quad C

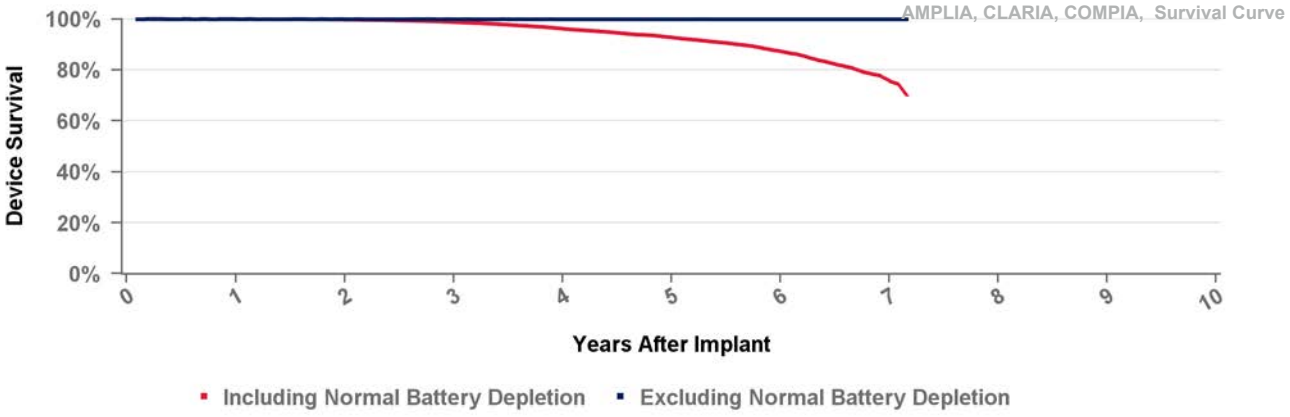
US Market Release	03Jul2014	**Total Malfunctions (USA)**	
CE Approval Date		**Therapy Function Not Compromised**	
Registered USA Implants			
Estimated Active USA Implants		**Therapy Function Compromised**	
Normal Battery Depletions			



Years	1	2	3	4	5	6	7	8	at 103 mo
Excluding NBD	100.0%	100.0%	99.9%	99.9%	99.9%	99.8%	99.8%	99.8%	99.8%
Including NBD	99.9%	99.8%	99.3%	98.1%	94.4%	85.4%	70.2%	47.4%	26.7%
Effective Sample Size	33771	31343	28906	25963	22291	17429	11584	4607	474

DTMA1D1 Claria MRI

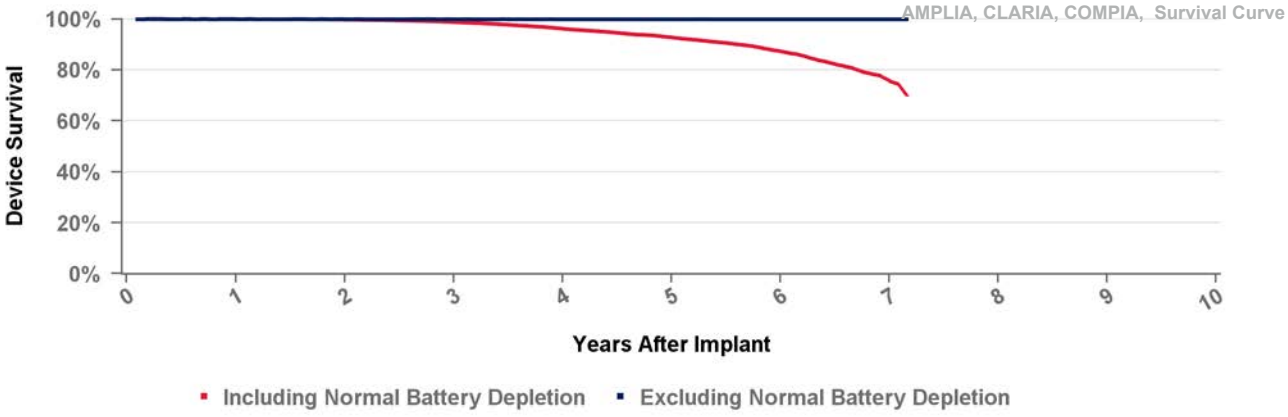
US Market Release	05Dec2016	**Total Malfunctions (USA)**	**9**
CE Approval Date		**Therapy Function Not Compromised**	**7**
Registered USA Implants	19,434	Battery	4
Estimated Active USA Implants	14,293	Electrical Component	1
Normal Battery Depletions	486	Electrical Interconnect	1
		Other	1
		Therapy Function Compromised	**2**
		Battery	1
		Electrical Component	1



Years	1	2	3	4	5	6	7	at 86 mo
Excluding NBD	100.0%	100.0%	99.9%	99.9%	99.9%	99.9%	99.9%	99.9%
Including NBD	99.9%	99.8%	98.8%	96.2%	92.8%	87.4%	75.7%	70.1%
Effective Sample Size	41181	32660	25538	18283	12090	5757	756	226

DTMA1D4 Claria MRI

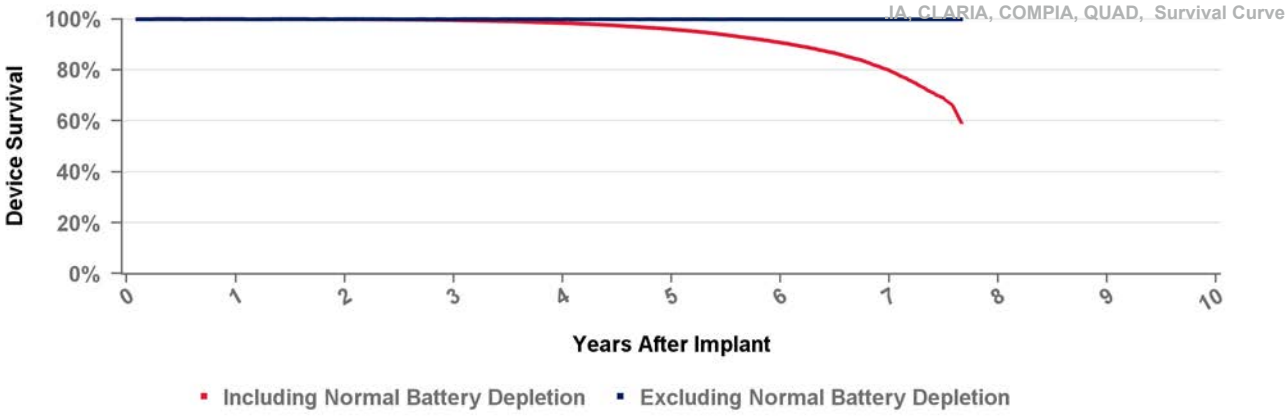
US Market Release	05Dec2016	**Total Malfunctions (USA)**	**11**
CE Approval Date		**Therapy Function Not Compromised**	**5**
Registered USA Implants	17,886	Battery	1
Estimated Active USA Implants	13,921	Electrical Component	4
Normal Battery Depletions	382	**Therapy Function Compromised**	**6**
		Battery	1
		Device-Related Current Pathway	2
		Electrical Component	2
		Electrical Interconnect	1



Years	1	2	3	4	5	6	7	at 86 mo
Excluding NBD	100.0%	100.0%	99.9%	99.9%	99.9%	99.9%	99.9%	99.9%
Including NBD	99.9%	99.8%	98.8%	96.2%	92.8%	87.4%	75.7%	70.1%
Effective Sample Size	41181	32660	25538	18283	12090	5757	756	226

DTMA1Q1 Claria MRI

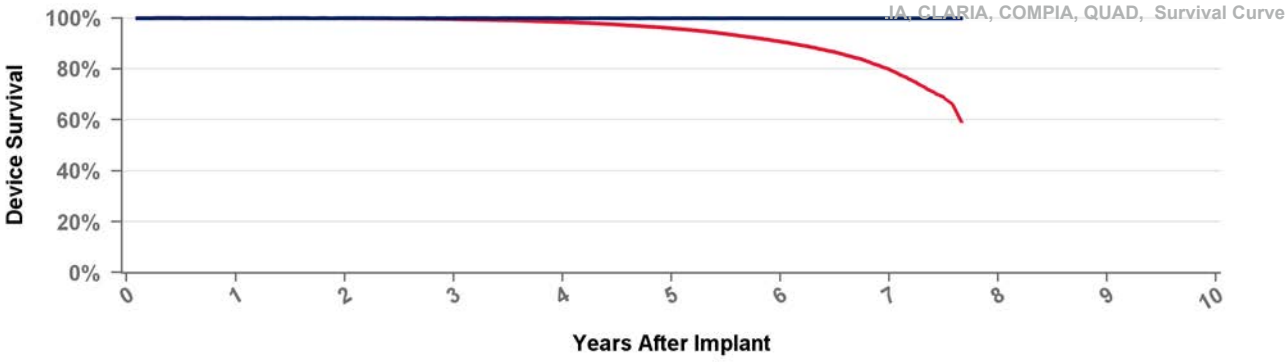
US Market Release	05Dec2016	**Total Malfunctions (USA)**	**4**
CE Approval Date		**Therapy Function Not Compromised**	**4**
Registered USA Implants	13,144	Battery	1
Estimated Active USA Implants	10,089	Electrical Interconnect	1
Normal Battery Depletions	261	Possible Early Battery Depletion	1
		Other	1
		Therapy Function Compromised	**0**



Years	1	2	3	4	5	6	7	at 92 mo
Excluding NBD	100.0%	100.0%	100.0%	99.9%	99.9%	99.9%	99.9%	99.9%
Including NBD	100.0%	99.9%	99.6%	98.4%	96.0%	90.7%	79.8%	59.3%
Effective Sample Size	112334	94166	77983	58748	38332	20535	6405	321

DTMA1QQ Claria MRI

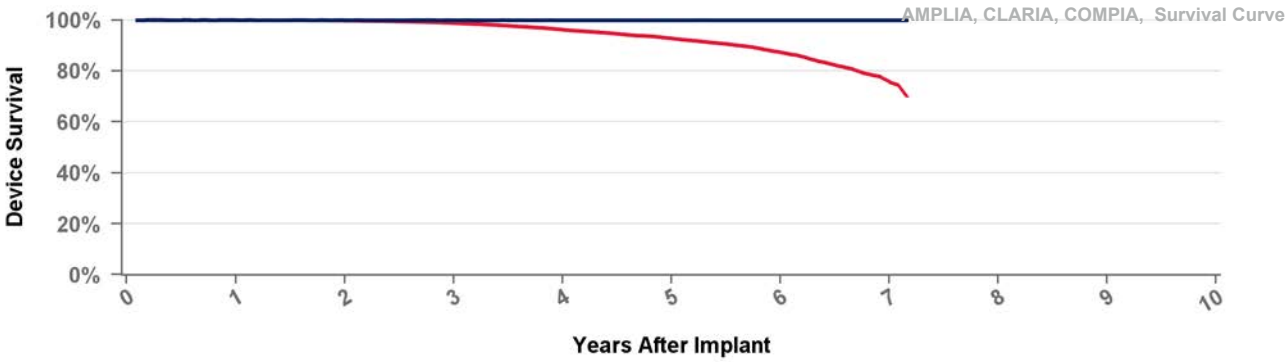
US Market Release	05Dec2016	**Total Malfunctions (USA)**	**32**
CE Approval Date		**Therapy Function Not Compromised**	**21**
Registered USA Implants	82,866	Battery	2
Estimated Active USA Implants	67,452	Electrical Component	13
Normal Battery Depletions	1,395	Electrical Interconnect	1
		Possible Early Battery Depletion	1
		Software/Firmware	1
		Other	3
		Therapy Function Compromised	**11**
		Device-Related Current Pathway	5
		Electrical Component	6



Years	1	2	3	4	5	6	7	at 92 mo
Excluding NBD	100.0%	100.0%	100.0%	99.9%	99.9%	99.9%	99.9%	99.9%
Including NBD	100.0%	99.9%	99.6%	98.4%	96.0%	90.7%	79.8%	59.3%
Effective Sample Size	112334	94166	77983	58748	38332	20535	6405	321

DTMA2D1 Claria MRI

US Market Release		**Total Malfunctions (USA)**	
CE Approval Date	29Aug2016	**Therapy Function Not Compromised**	
Registered USA Implants			
Estimated Active USA Implants		**Therapy Function Compromised**	
Normal Battery Depletions			

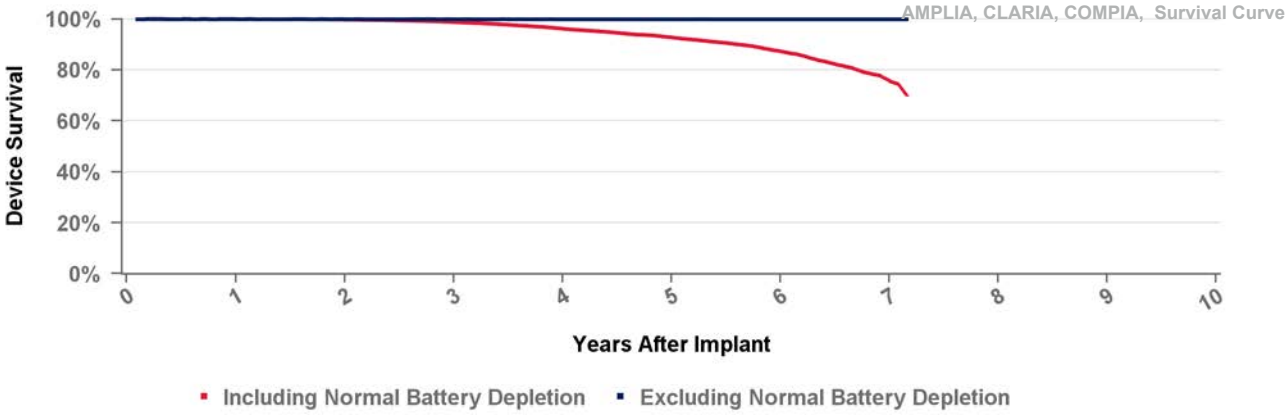


Years	1	2	3	4	5	6	7	at 86 mo
Excluding NBD	100.0%	100.0%	99.9%	99.9%	99.9%	99.9%	99.9%	99.9%
Including NBD	99.9%	99.8%	98.8%	96.2%	92.8%	87.4%	75.7%	70.1%
Effective Sample Size	41181	32660	25538	18283	12090	5757	756	226

DTMA2D4 Claria MRI

US Market Release
CE Approval Date 19Feb2016
Registered USA Implants
Estimated Active USA Implants
Normal Battery Depletions

Total Malfunctions (USA)
Therapy Function Not Compromised
Therapy Function Compromised

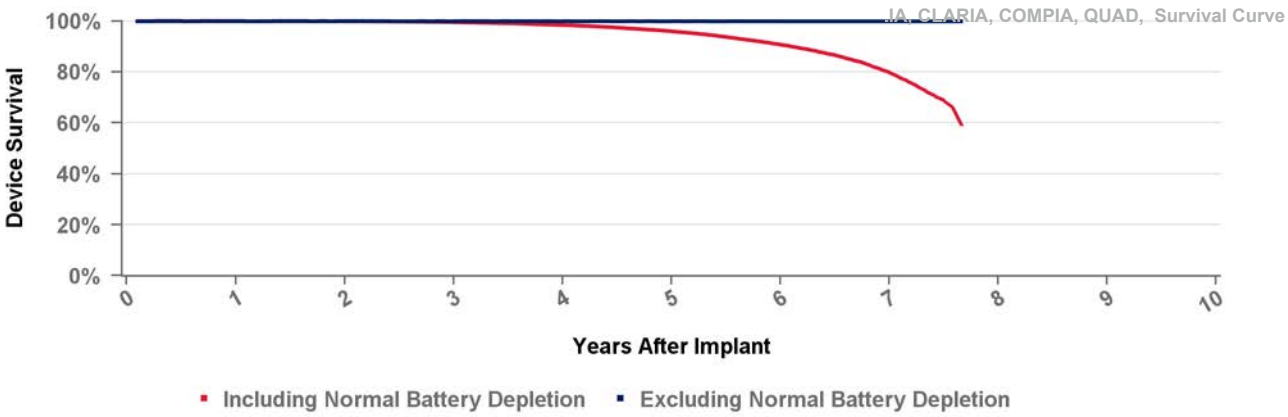


Years	1	2	3	4	5	6	7	at 86 mo
Excluding NBD	100.0%	100.0%	99.9%	99.9%	99.9%	99.9%	99.9%	99.9%
Including NBD	99.9%	99.8%	98.8%	96.2%	92.8%	87.4%	75.7%	70.1%
Effective Sample Size	41181	32660	25538	18283	12090	5757	756	226

DTMA2Q1 Claria MRI

US Market Release
CE Approval Date 29Aug2016
Registered USA Implants
Estimated Active USA Implants
Normal Battery Depletions

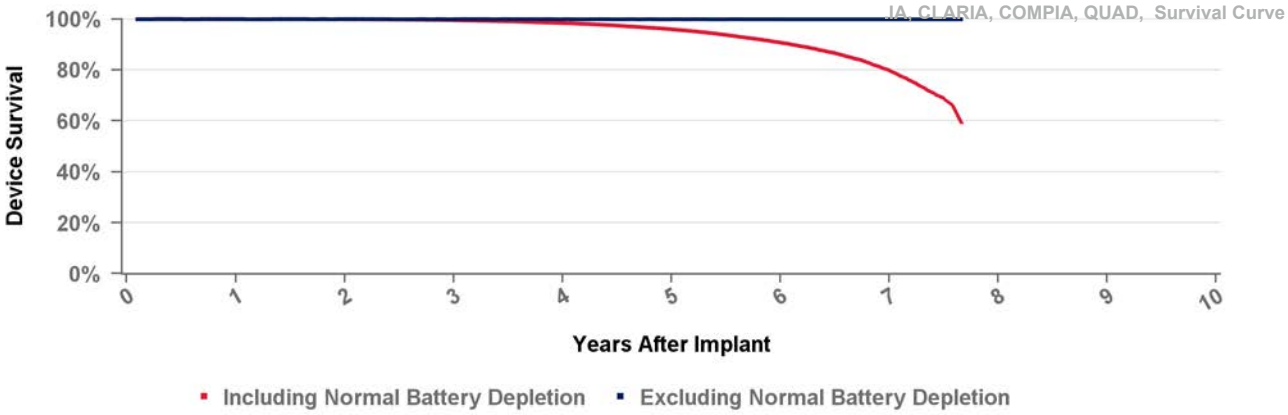
Total Malfunctions (USA)
Therapy Function Not Compromised
Therapy Function Compromised



Years	1	2	3	4	5	6	7	at 92 mo
Excluding NBD	100.0%	100.0%	100.0%	99.9%	99.9%	99.9%	99.9%	99.9%
Including NBD	100.0%	99.9%	99.6%	98.4%	96.0%	90.7%	79.8%	59.3%
Effective Sample Size	112334	94166	77983	58748	38332	20535	6405	321

DTMA2QQ Claria MRI

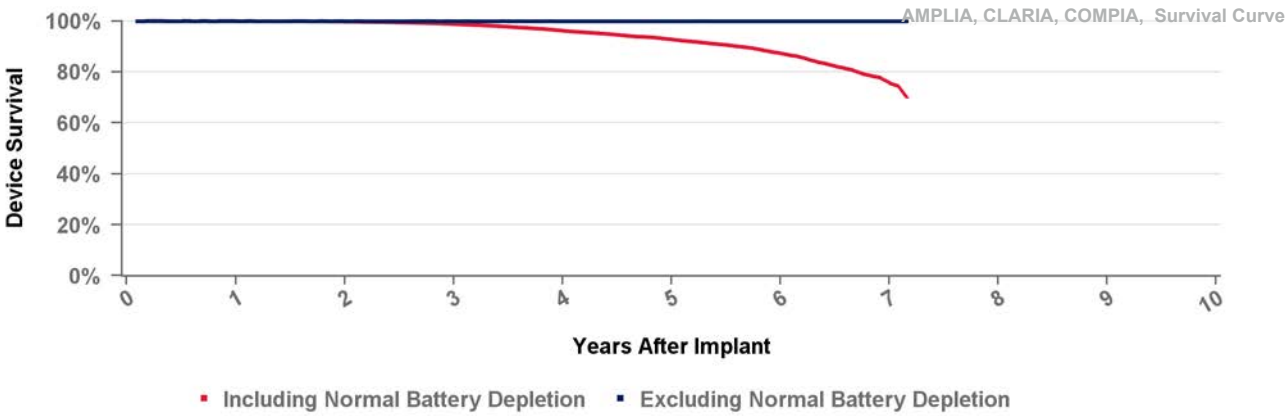
US Market Release		**Total Malfunctions (USA)**	
CE Approval Date	19Feb2016	**Therapy Function Not Compromised**	
Registered USA Implants			
Estimated Active USA Implants		**Therapy Function Compromised**	
Normal Battery Depletions			



Years	1	2	3	4	5	6	7	at 92 mo
Excluding NBD	100.0%	100.0%	100.0%	99.9%	99.9%	99.9%	99.9%	99.9%
Including NBD	100.0%	99.9%	99.6%	98.4%	96.0%	90.7%	79.8%	59.3%
Effective Sample Size	112334	94166	77983	58748	38332	20535	6405	321

DTMB1D1 Amplia MRI

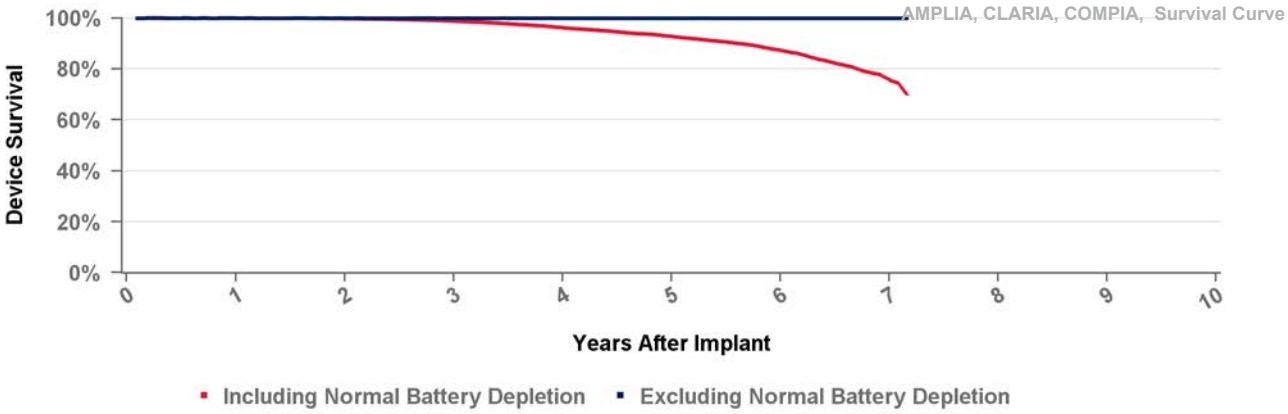
US Market Release	05Dec2016	**Total Malfunctions (USA)**	**5**
CE Approval Date		**Therapy Function Not Compromised**	**4**
Registered USA Implants	9,228	Battery	1
Estimated Active USA Implants	5,950	Electrical Component	2
Normal Battery Depletions	357	Other	1
		Therapy Function Compromised	**1**
		Battery	1



Years	1	2	3	4	5	6	7	at 86 mo
Excluding NBD	100.0%	100.0%	99.9%	99.9%	99.9%	99.9%	99.9%	99.9%
Including NBD	99.9%	99.8%	98.8%	96.2%	92.8%	87.4%	75.7%	70.1%
Effective Sample Size	41181	32660	25538	18283	12090	5757	756	226

DTMB1D4 Amplia MRI

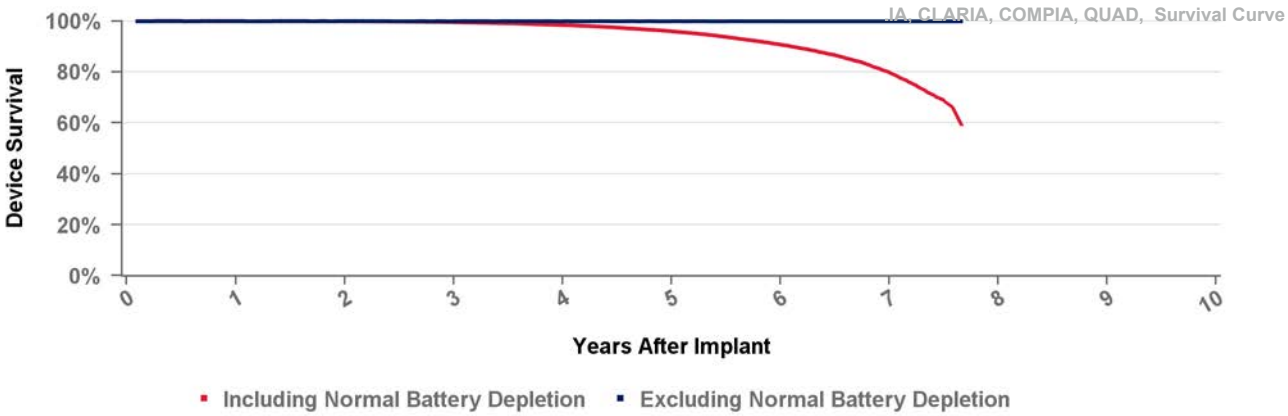
US Market Release	01Feb2016	**Total Malfunctions (USA)**	**3**
CE Approval Date		**Therapy Function Not Compromised**	**2**
Registered USA Implants	9,880	Electrical Component	2
Estimated Active USA Implants	5,800	**Therapy Function Compromised**	**1**
Normal Battery Depletions	512	Possible Early Battery Depletion	1



Years	1	2	3	4	5	6	7	at 86 mo
Excluding NBD	100.0%	100.0%	99.9%	99.9%	99.9%	99.9%	99.9%	99.9%
Including NBD	99.9%	99.8%	98.8%	96.2%	92.8%	87.4%	75.7%	70.1%
Effective Sample Size	41181	32660	25538	18283	12090	5757	756	226

DTMB1Q1 Amplia MRI

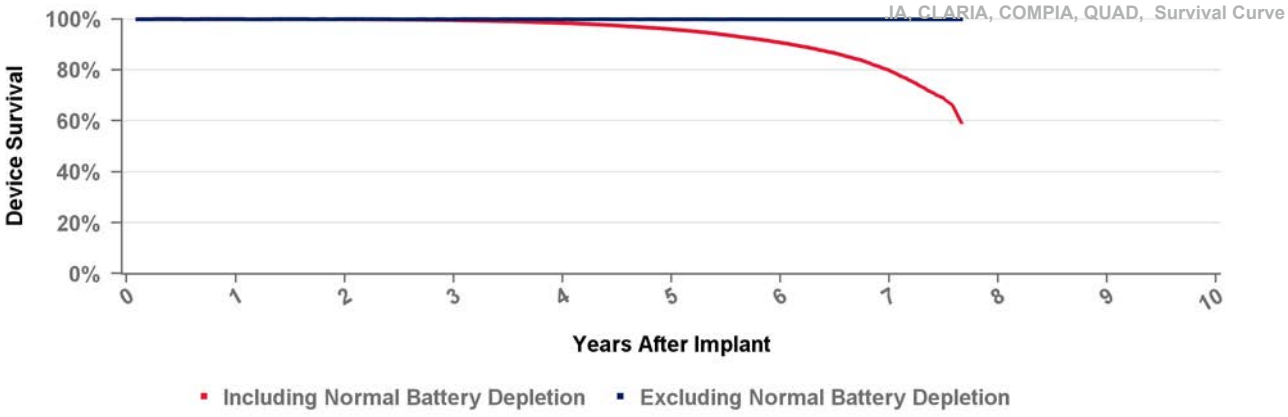
US Market Release	05Dec2016	**Total Malfunctions (USA)**	**2**
CE Approval Date		**Therapy Function Not Compromised**	**1**
Registered USA Implants	5,942	Battery	1
Estimated Active USA Implants	3,979	**Therapy Function Compromised**	**1**
Normal Battery Depletions	193	Battery	1



Years	1	2	3	4	5	6	7	at 92 mo
Excluding NBD	100.0%	100.0%	100.0%	99.9%	99.9%	99.9%	99.9%	99.9%
Including NBD	100.0%	99.9%	99.6%	98.4%	96.0%	90.7%	79.8%	59.3%
Effective Sample Size	112334	94166	77983	58748	38332	20535	6405	321

DTMB1QQ Amplia MRI

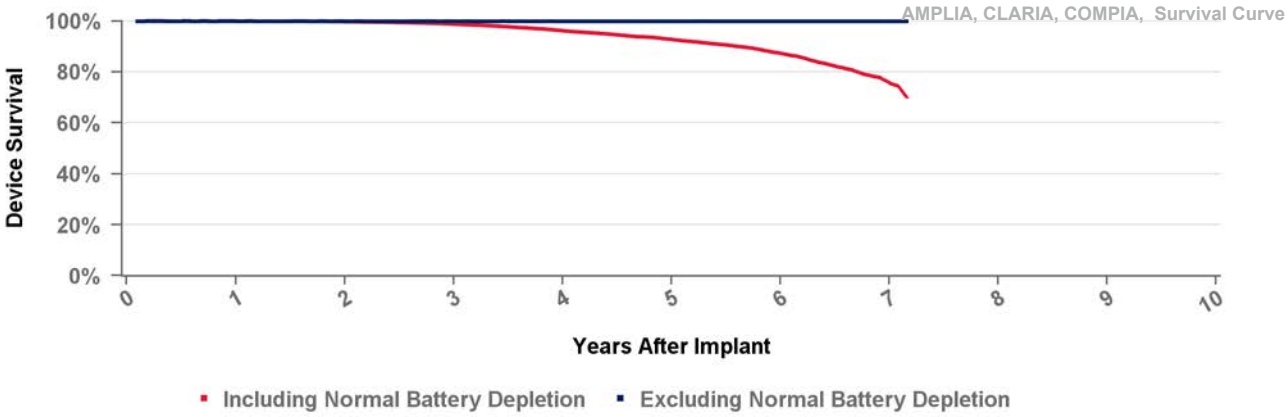
US Market Release	01Feb2016	**Total Malfunctions (USA)**	**37**
CE Approval Date		**Therapy Function Not Compromised**	**28**
Registered USA Implants	49,459	Battery	12
Estimated Active USA Implants	30,001	Electrical Component	10
Normal Battery Depletions	2,819	Possible Early Battery Depletion	3
		Other	3
		Therapy Function Compromised	**9**
		Battery	8
		Device-Related Current Pathway	1



Years	1	2	3	4	5	6	7	at 92 mo
Excluding NBD	100.0%	100.0%	100.0%	99.9%	99.9%	99.9%	99.9%	99.9%
Including NBD	100.0%	99.9%	99.6%	98.4%	96.0%	90.7%	79.8%	59.3%
Effective Sample Size	112334	94166	77983	58748	38332	20535	6405	321

DTMB2D1 Amplia MRI

US Market Release		**Total Malfunctions (USA)**	
CE Approval Date	29Aug2016	**Therapy Function Not Compromised**	
Registered USA Implants			
Estimated Active USA Implants		**Therapy Function Compromised**	
Normal Battery Depletions			

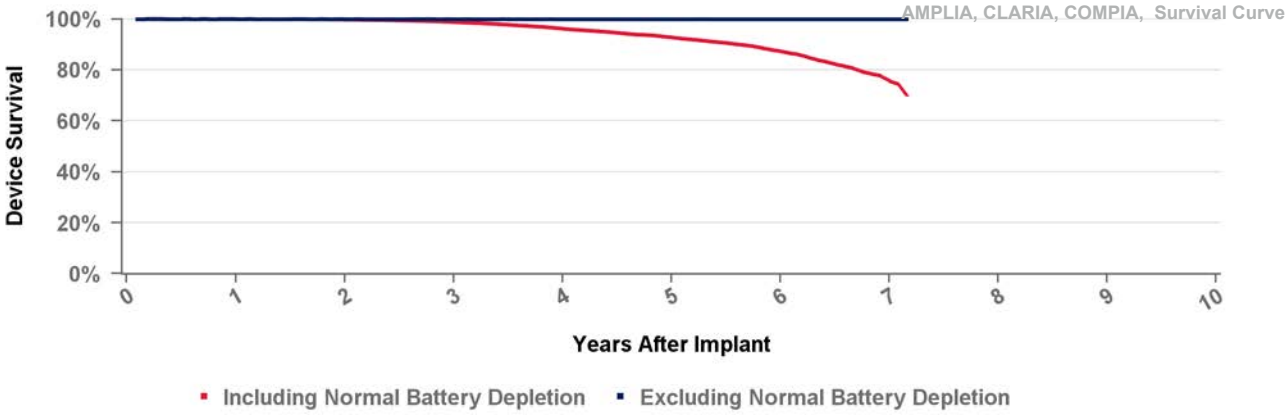


Years	1	2	3	4	5	6	7	at 86 mo
Excluding NBD	100.0%	100.0%	99.9%	99.9%	99.9%	99.9%	99.9%	99.9%
Including NBD	99.9%	99.8%	98.8%	96.2%	92.8%	87.4%	75.7%	70.1%
Effective Sample Size	41181	32660	25538	18283	12090	5757	756	226

DTMB2D4 Amplia MRI

US Market Release
CE Approval Date 19Feb2016
Registered USA Implants
Estimated Active USA Implants
Normal Battery Depletions

Total Malfunctions (USA)
Therapy Function Not Compromised
Therapy Function Compromised

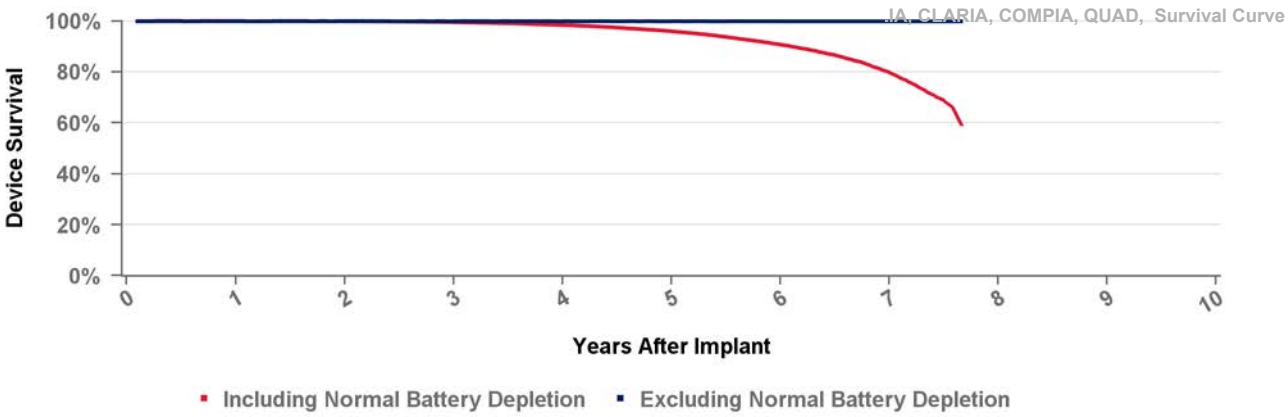


Years	1	2	3	4	5	6	7	at 86 mo
Excluding NBD	100.0%	100.0%	99.9%	99.9%	99.9%	99.9%	99.9%	99.9%
Including NBD	99.9%	99.8%	98.8%	96.2%	92.8%	87.4%	75.7%	70.1%
Effective Sample Size	41181	32660	25538	18283	12090	5757	756	226

DTMB2Q1 Amplia MRI

US Market Release
CE Approval Date 29Aug2016
Registered USA Implants
Estimated Active USA Implants
Normal Battery Depletions

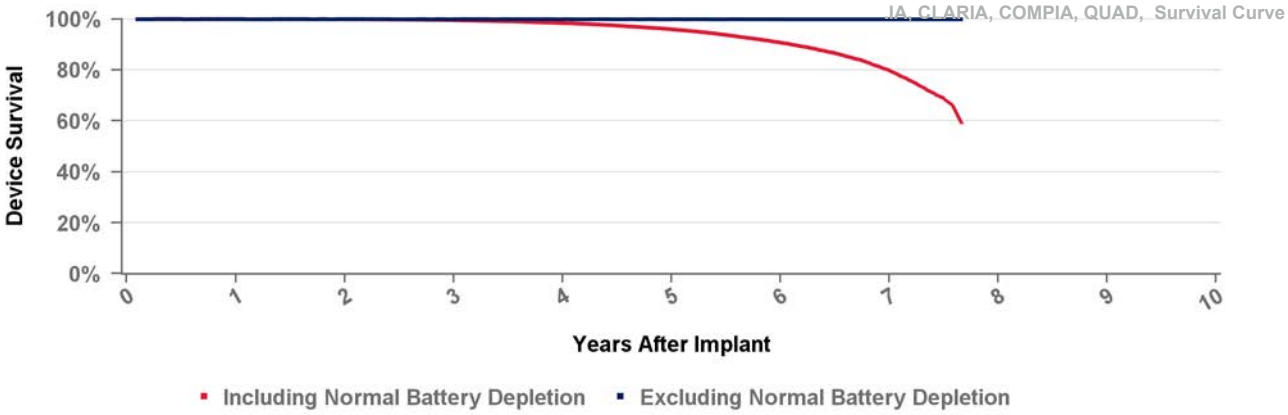
Total Malfunctions (USA)
Therapy Function Not Compromised
Therapy Function Compromised



Years	1	2	3	4	5	6	7	at 92 mo
Excluding NBD	100.0%	100.0%	100.0%	99.9%	99.9%	99.9%	99.9%	99.9%
Including NBD	100.0%	99.9%	99.6%	98.4%	96.0%	90.7%	79.8%	59.3%
Effective Sample Size	112334	94166	77983	58748	38332	20535	6405	321

DTMB2QQ Amplia MRI

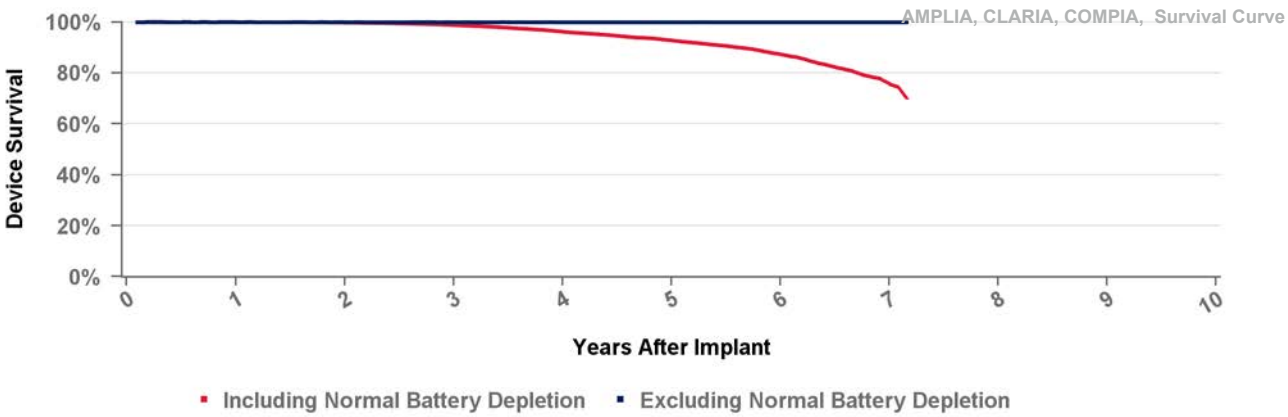
US Market Release		**Total Malfunctions (USA)**	
CE Approval Date	19Feb2016	**Therapy Function Not Compromised**	
Registered USA Implants			
Estimated Active USA Implants		**Therapy Function Compromised**	
Normal Battery Depletions			



Years	1	2	3	4	5	6	7	at 92 mo
Excluding NBD	100.0%	100.0%	100.0%	99.9%	99.9%	99.9%	99.9%	99.9%
Including NBD	100.0%	99.9%	99.6%	98.4%	96.0%	90.7%	79.8%	59.3%
Effective Sample Size	112334	94166	77983	58748	38332	20535	6405	321

DTMC1D1 Compia MRI

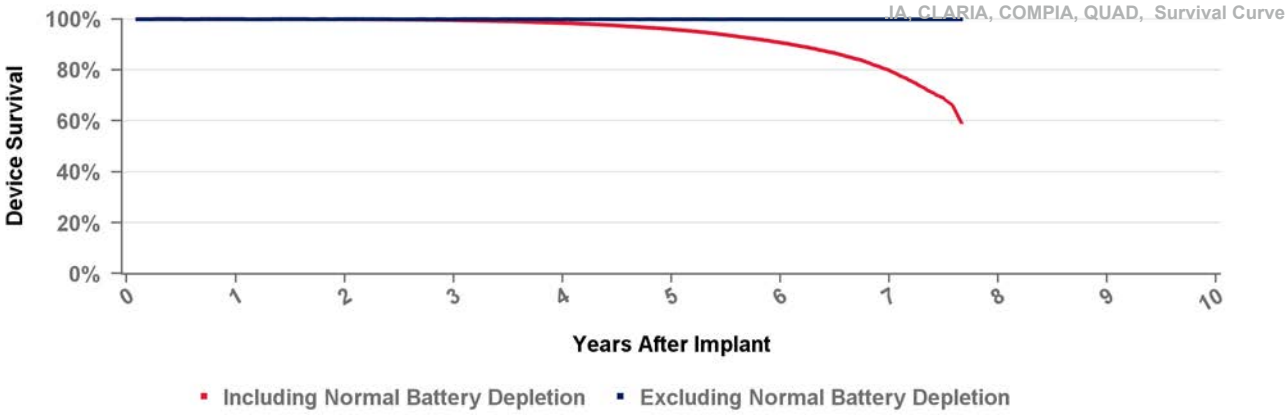
US Market Release	05Dec2016	**Total Malfunctions (USA)**	**1**
CE Approval Date		**Therapy Function Not Compromised**	**0**
Registered USA Implants	1,401		
Estimated Active USA Implants	970	**Therapy Function Compromised**	**1**
Normal Battery Depletions	53	Device-Related Current Pathway	1



Years	1	2	3	4	5	6	7	at 86 mo
Excluding NBD	100.0%	100.0%	99.9%	99.9%	99.9%	99.9%	99.9%	99.9%
Including NBD	99.9%	99.8%	98.8%	96.2%	92.8%	87.4%	75.7%	70.1%
Effective Sample Size	41181	32660	25538	18283	12090	5757	756	226

DTMC1QQ Compia MRI

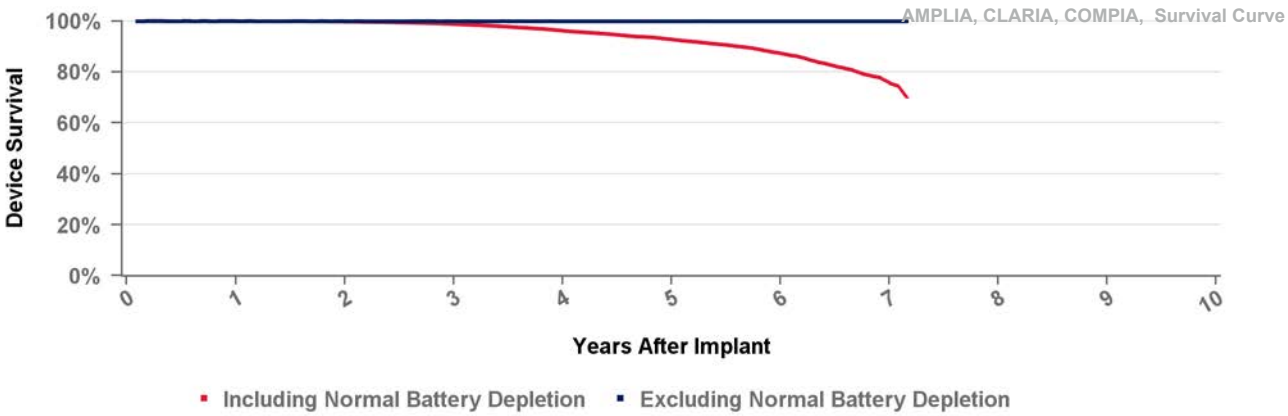
US Market Release	01Feb2016	**Total Malfunctions (USA)**	**3**
CE Approval Date		**Therapy Function Not Compromised**	**3**
Registered USA Implants	6,540	Battery	1
Estimated Active USA Implants	4,331	Electrical Component	2
Normal Battery Depletions	420	**Therapy Function Compromised**	**0**



Years	1	2	3	4	5	6	7	at 92 mo
Excluding NBD	100.0%	100.0%	100.0%	99.9%	99.9%	99.9%	99.9%	99.9%
Including NBD	100.0%	99.9%	99.6%	98.4%	96.0%	90.7%	79.8%	59.3%
Effective Sample Size	112334	94166	77983	58748	38332	20535	6405	321

DTMC2D1 Compia MRI

US Market Release		**Total Malfunctions (USA)**	
CE Approval Date	29Aug2016	**Therapy Function Not Compromised**	
Registered USA Implants			
Estimated Active USA Implants		**Therapy Function Compromised**	
Normal Battery Depletions			

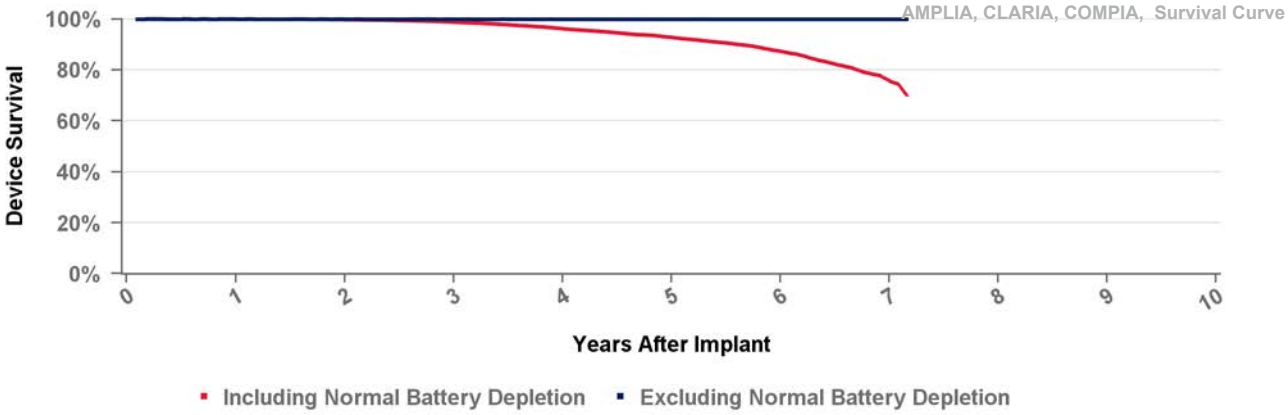


Years	1	2	3	4	5	6	7	at 86 mo
Excluding NBD	100.0%	100.0%	99.9%	99.9%	99.9%	99.9%	99.9%	99.9%
Including NBD	99.9%	99.8%	98.8%	96.2%	92.8%	87.4%	75.7%	70.1%
Effective Sample Size	41181	32660	25538	18283	12090	5757	756	226

DTMC2D4 Compia MRI

US Market Release
CE Approval Date 19Feb2016
Registered USA Implants
Estimated Active USA Implants
Normal Battery Depletions

Total Malfunctions (USA)
Therapy Function Not Compromised
Therapy Function Compromised

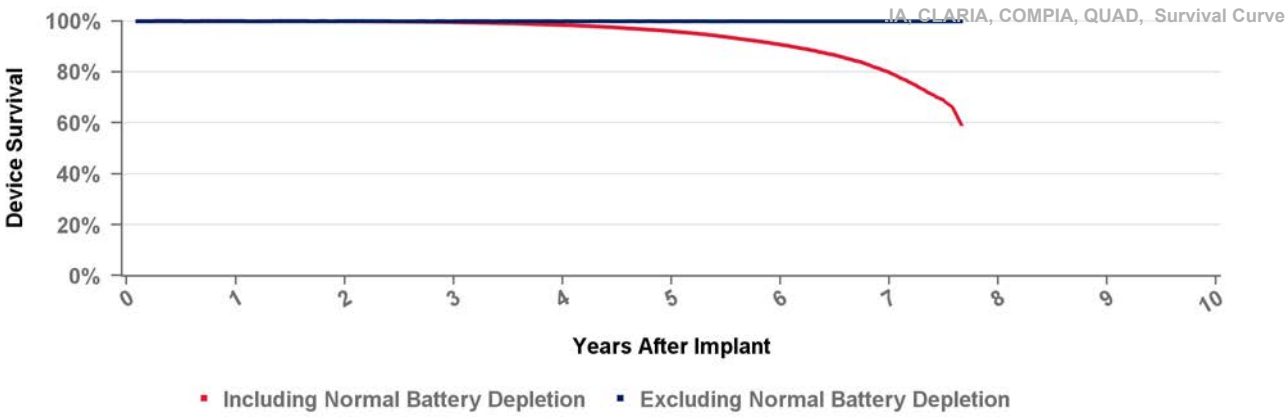


Years	1	2	3	4	5	6	7	at 86 mo
Excluding NBD	100.0%	100.0%	99.9%	99.9%	99.9%	99.9%	99.9%	99.9%
Including NBD	99.9%	99.8%	98.8%	96.2%	92.8%	87.4%	75.7%	70.1%
Effective Sample Size	41181	32660	25538	18283	12090	5757	756	226

DTMC2QQ Compia MRI

US Market Release
CE Approval Date 19Feb2016
Registered USA Implants
Estimated Active USA Implants
Normal Battery Depletions

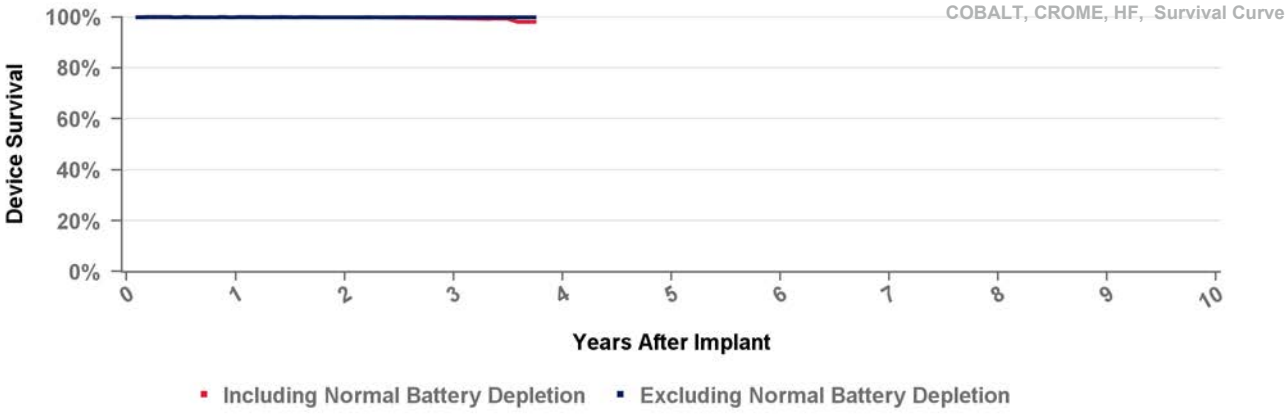
Total Malfunctions (USA)
Therapy Function Not Compromised
Therapy Function Compromised



Years	1	2	3	4	5	6	7	at 92 mo
Excluding NBD	100.0%	100.0%	100.0%	99.9%	99.9%	99.9%	99.9%	99.9%
Including NBD	100.0%	99.9%	99.6%	98.4%	96.0%	90.7%	79.8%	59.3%
Effective Sample Size	112334	94166	77983	58748	38332	20535	6405	321

DTPA2D1 Cobalt XT HF

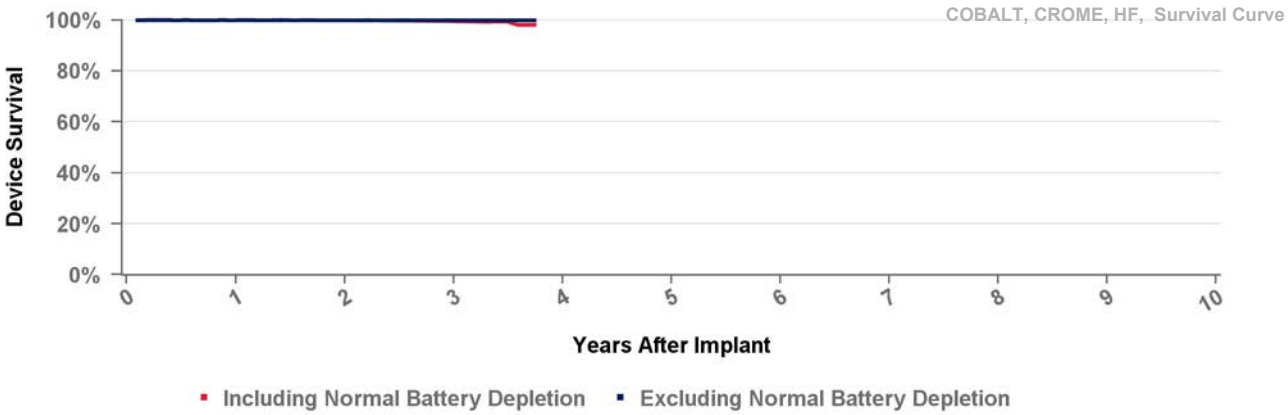
US Market Release	23Apr2020	**Total Malfunctions (USA)**	**1**
CE Approval Date	18Dec2019	**Therapy Function Not Compromised**	**1**
Registered USA Implants	8,517	Other	1
Estimated Active USA Implants	8,128	**Therapy Function Compromised**	**0**
Normal Battery Depletions	6		



Years	1	2	3	at 45 mo
Excluding NBD	100.0%	100.0%	99.9%	99.9%
Including NBD	100.0%	99.9%	99.5%	98.0%
Effective Sample Size	41320	22983	6831	190

DTPA2D4 Cobalt XT HF

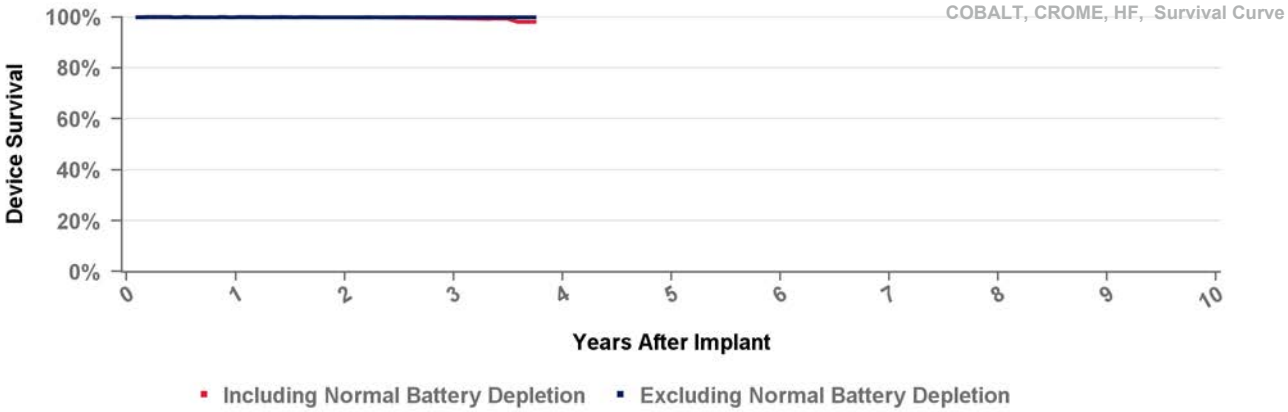
US Market Release	23Apr2020	**Total Malfunctions (USA)**	**3**
CE Approval Date	18Dec2019	**Therapy Function Not Compromised**	**2**
Registered USA Implants	10,930	Electrical Component	1
Estimated Active USA Implants	10,457	Electrical Interconnect	1
Normal Battery Depletions	6	**Therapy Function Compromised**	**1**
		Electrical Interconnect	1



Years	1	2	3	at 45 mo
Excluding NBD	100.0%	100.0%	99.9%	99.9%
Including NBD	100.0%	99.9%	99.5%	98.0%
Effective Sample Size	41320	22983	6831	190

DTPA2Q1 Cobalt XT HF Quad

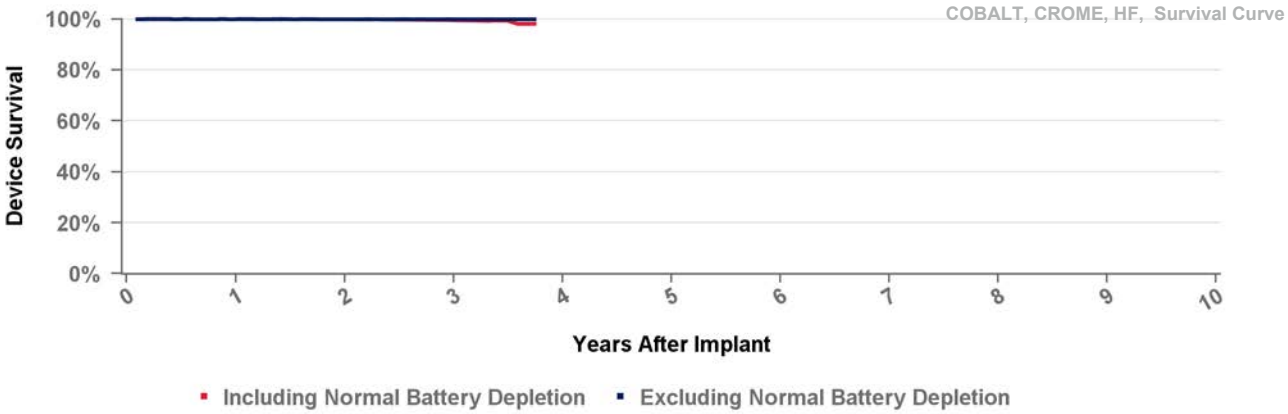
US Market Release	23Apr2020	**Total Malfunctions (USA)**	**1**
CE Approval Date	18Dec2019	**Therapy Function Not Compromised**	**1**
Registered USA Implants	5,746	Software/Firmware	1
Estimated Active USA Implants	5,432	**Therapy Function Compromised**	**0**
Normal Battery Depletions	4		



Years	1	2	3	at 45 mo
Excluding NBD	100.0%	100.0%	99.9%	99.9%
Including NBD	100.0%	99.9%	99.5%	98.0%
Effective Sample Size	41320	22983	6831	190

DTPA2QQ Cobalt XT HF Quad

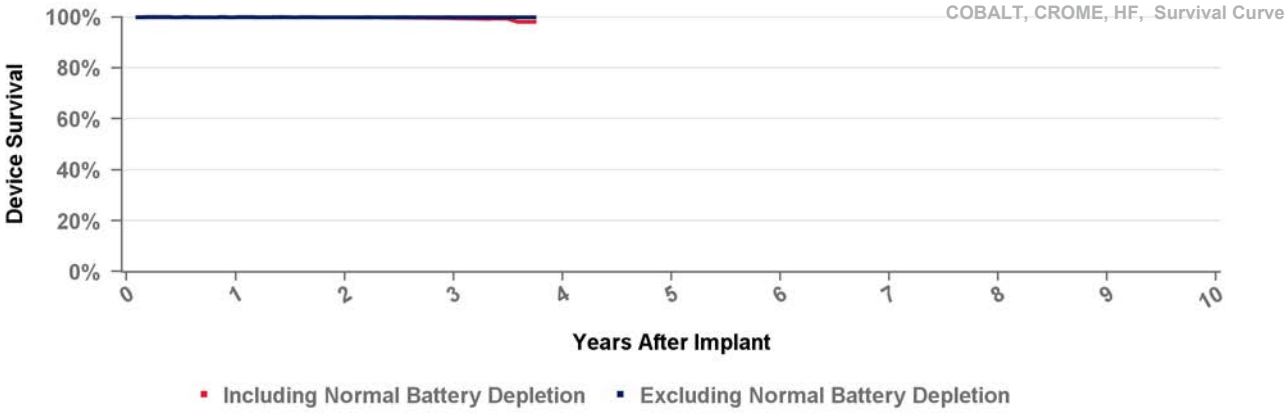
US Market Release	23Apr2020	**Total Malfunctions (USA)**	**5**
CE Approval Date	18Dec2019	**Therapy Function Not Compromised**	**3**
Registered USA Implants	55,533	Electrical Component	2
Estimated Active USA Implants	53,581	Software/Firmware	1
Normal Battery Depletions	6	**Therapy Function Compromised**	**2**
		Electrical Component	1
		Electrical Interconnect	1



Years	1	2	3	at 45 mo
Excluding NBD	100.0%	100.0%	99.9%	99.9%
Including NBD	100.0%	99.9%	99.5%	98.0%
Effective Sample Size	41320	22983	6831	190

DTPB2D1 Cobalt HF

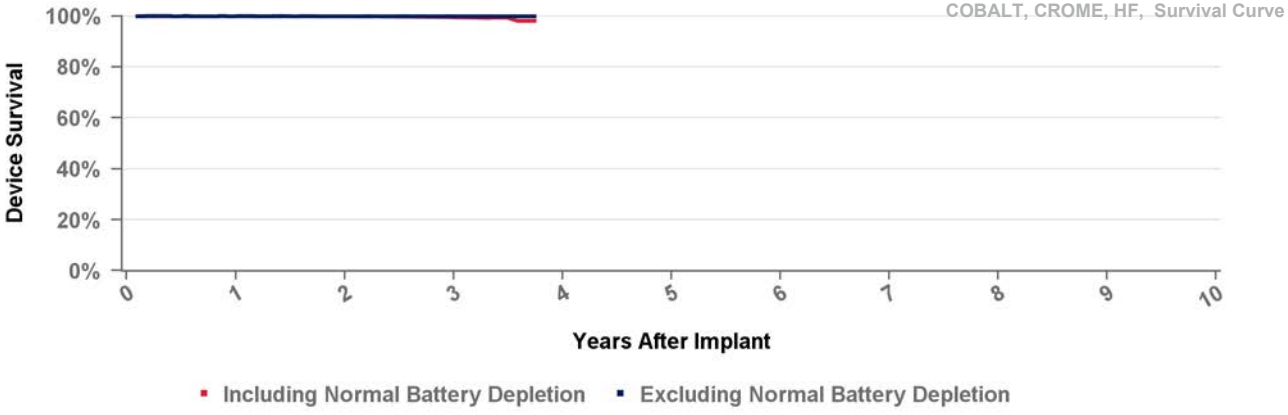
US Market Release	23Apr2020	**Total Malfunctions (USA)**	**3**
CE Approval Date	18Dec2019	**Therapy Function Not Compromised**	**1**
Registered USA Implants	6,982	Electrical Component	1
Estimated Active USA Implants	6,446	**Therapy Function Compromised**	**2**
Normal Battery Depletions	10	Electrical Component	1
		Electrical Interconnect	1



Years	1	2	3	at 45 mo
Excluding NBD	100.0%	100.0%	99.9%	99.9%
Including NBD	100.0%	99.9%	99.5%	98.0%
Effective Sample Size	41320	22983	6831	190

DTPB2D4 Cobalt HF

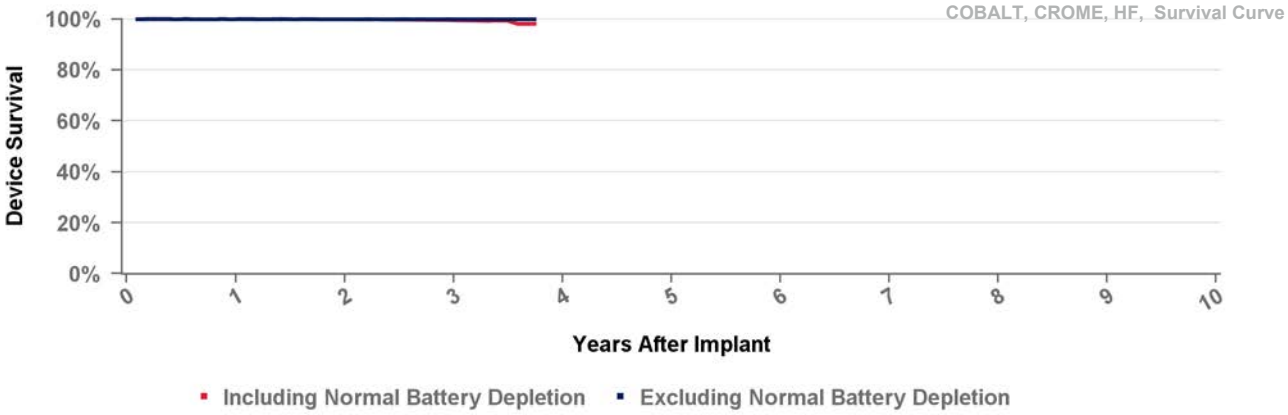
US Market Release	23Apr2020	**Total Malfunctions (USA)**	**5**
CE Approval Date	18Dec2019	**Therapy Function Not Compromised**	**4**
Registered USA Implants	7,134	Electrical Interconnect	3
Estimated Active USA Implants	6,657	Software/Firmware	1
Normal Battery Depletions	4	**Therapy Function Compromised**	**1**
		Electrical Component	1



Years	1	2	3	at 45 mo
Excluding NBD	100.0%	100.0%	99.9%	99.9%
Including NBD	100.0%	99.9%	99.5%	98.0%
Effective Sample Size	41320	22983	6831	190

DTPB2Q1 Cobalt HF Quad

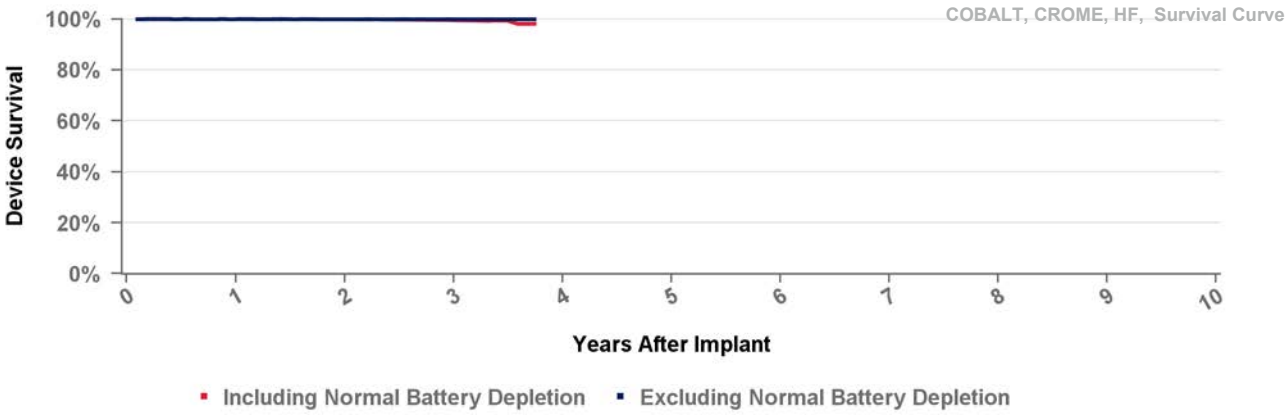
US Market Release	23Apr2020	**Total Malfunctions (USA)**	
CE Approval Date	18Dec2019	**Therapy Function Not Compromised**	
Registered USA Implants	4,646		
Estimated Active USA Implants	4,311	**Therapy Function Compromised**	
Normal Battery Depletions	4		



Years	1	2	3	at 45 mo
Excluding NBD	100.0%	100.0%	99.9%	99.9%
Including NBD	100.0%	99.9%	99.5%	98.0%
Effective Sample Size	41320	22983	6831	190

DTPB2QQ Cobalt HF Quad

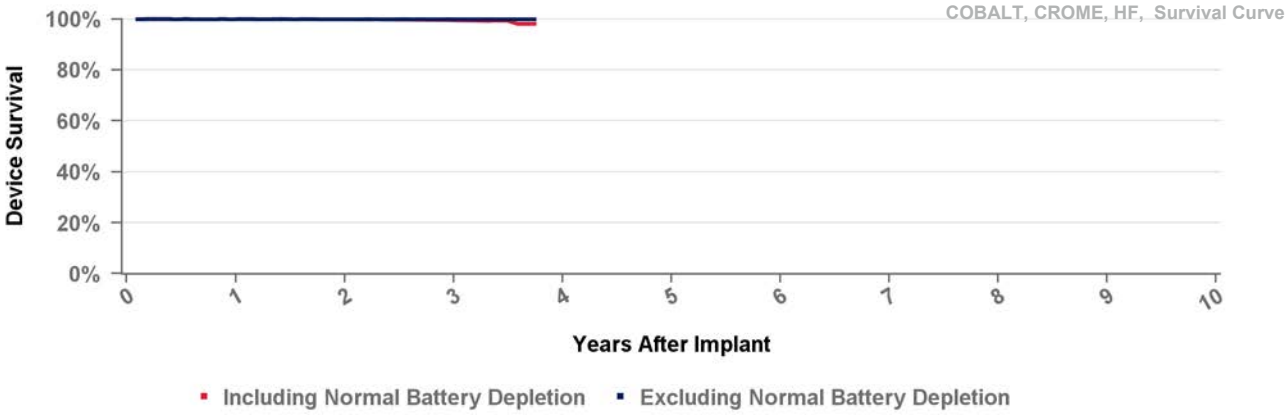
US Market Release	23Apr2020	**Total Malfunctions (USA)**	**12**
CE Approval Date	18Dec2019	**Therapy Function Not Compromised**	**6**
Registered USA Implants	36,166	Electrical Component	4
Estimated Active USA Implants	34,163	Electrical Interconnect	1
Normal Battery Depletions	30	Other	1
		Therapy Function Compromised	**6**
		Electrical Component	3
		Electrical Interconnect	3



Years	1	2	3	at 45 mo
Excluding NBD	100.0%	100.0%	99.9%	99.9%
Including NBD	100.0%	99.9%	99.5%	98.0%
Effective Sample Size	41320	22983	6831	190

DTPC2D1 Crome HF

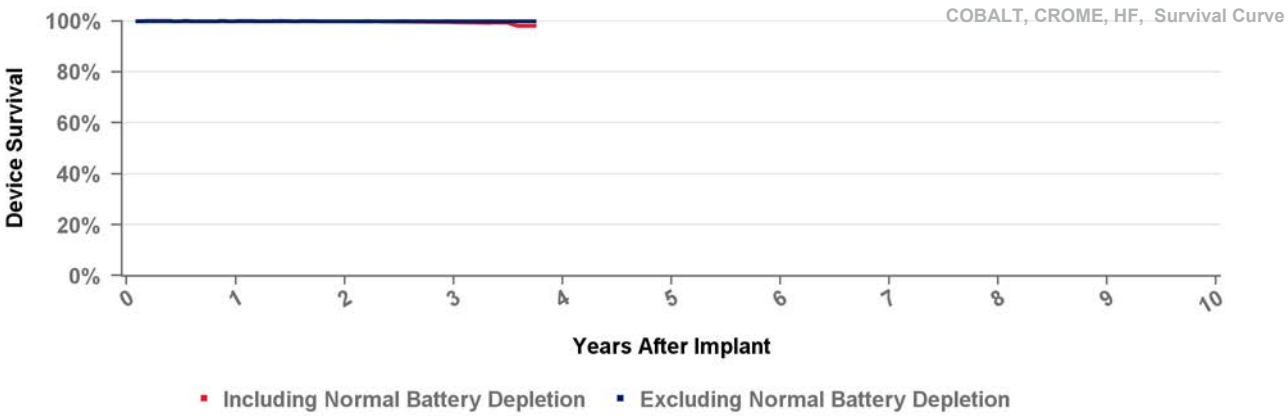
US Market Release	23Apr2020	**Total Malfunctions (USA)**	
CE Approval Date	18Dec2019	**Therapy Function Not Compromised**	
Registered USA Implants	586		
Estimated Active USA Implants	534	**Therapy Function Compromised**	
Normal Battery Depletions			



Years	1	2	3	at 45 mo
Excluding NBD	100.0%	100.0%	99.9%	99.9%
Including NBD	100.0%	99.9%	99.5%	98.0%
Effective Sample Size	41320	22983	6831	190

DTPC2D4 Crome HF

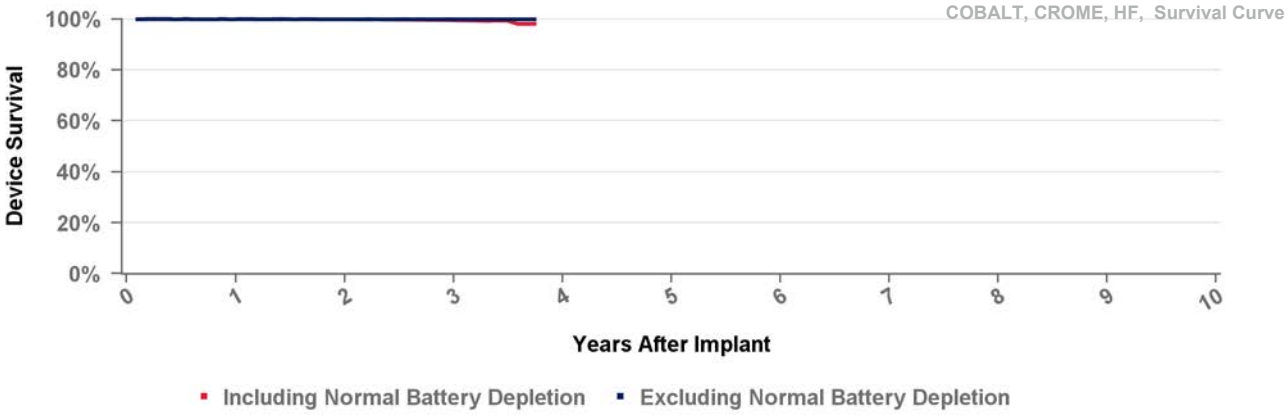
US Market Release	23Apr2020	**Total Malfunctions (USA)**	
CE Approval Date	18Dec2019	**Therapy Function Not Compromised**	
Registered USA Implants	606		
Estimated Active USA Implants	563	**Therapy Function Compromised**	
Normal Battery Depletions	4		



Years	1	2	3	at 45 mo
Excluding NBD	100.0%	100.0%	99.9%	99.9%
Including NBD	100.0%	99.9%	99.5%	98.0%
Effective Sample Size	41320	22983	6831	190

DTPC2Q1 Crome HF Quad

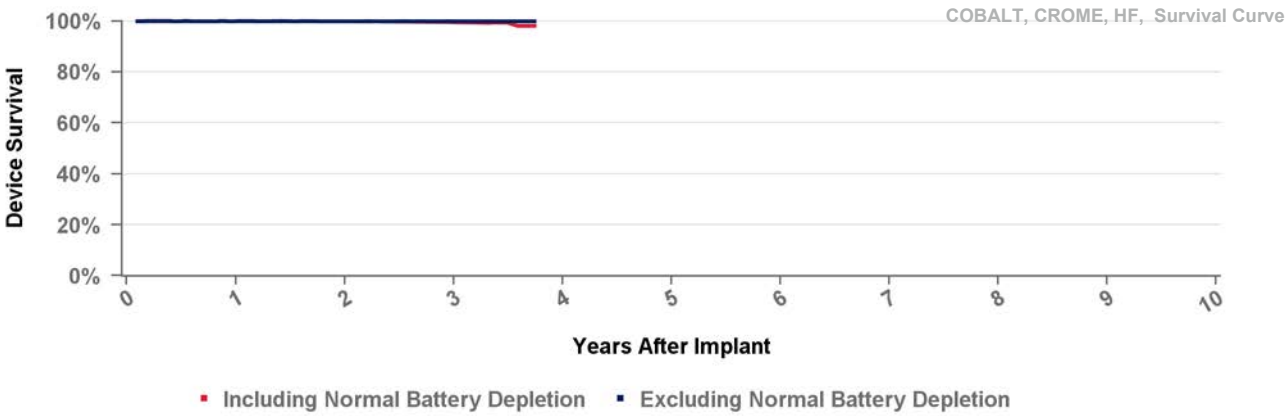
US Market Release	23Apr2020	**Total Malfunctions (USA)**
CE Approval Date	18Dec2019	**Therapy Function Not Compromised**
Registered USA Implants	261	
Estimated Active USA Implants	245	**Therapy Function Compromised**
Normal Battery Depletions	2	



Years	1	2	3	at 45 mo
Excluding NBD	100.0%	100.0%	99.9%	99.9%
Including NBD	100.0%	99.9%	99.5%	98.0%
Effective Sample Size	41320	22983	6831	190

DTPC2QQ Crome HF Quad

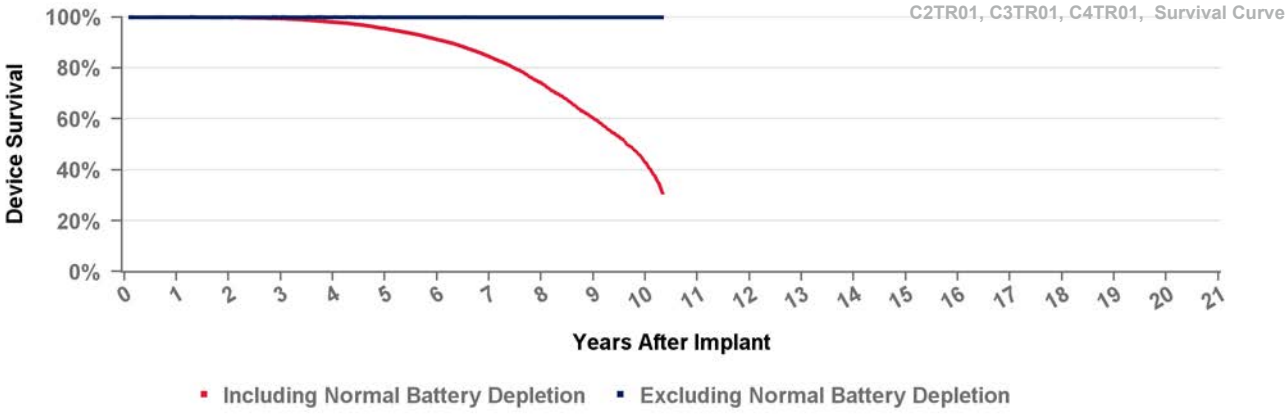
US Market Release	23Apr2020	**Total Malfunctions (USA)**
CE Approval Date	18Dec2019	**Therapy Function Not Compromised**
Registered USA Implants	2,652	
Estimated Active USA Implants	2,509	**Therapy Function Compromised**
Normal Battery Depletions	2	



Years	1	2	3	at 45 mo
Excluding NBD	100.0%	100.0%	99.9%	99.9%
Including NBD	100.0%	99.9%	99.5%	98.0%
Effective Sample Size	41320	22983	6831	190

C2TR01 Syncra CRT-P

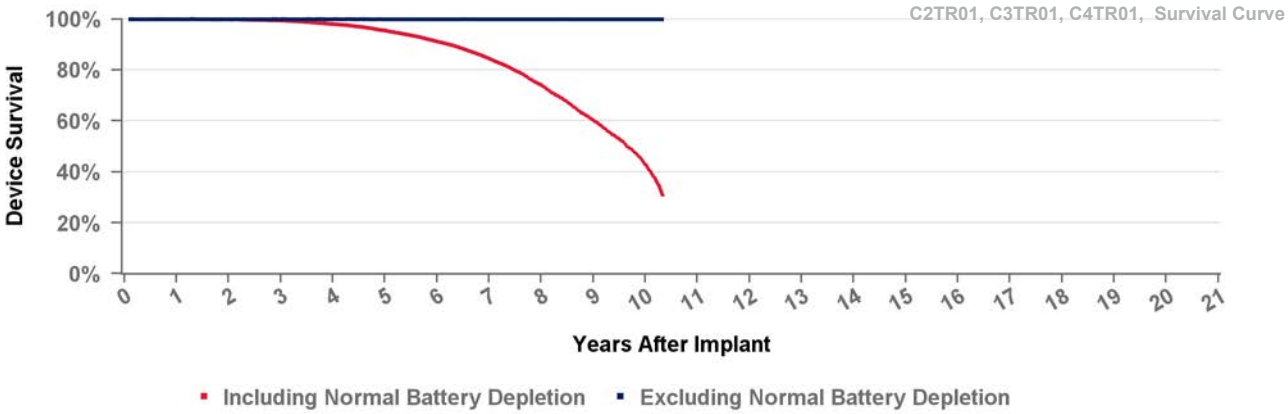
US Market Release	22Mar2011	**Total Malfunctions (USA)**	**7**
CE Approval Date	11May2010	**Therapy Function Not Compromised**	**6**
Registered USA Implants	10,237	Possible Early Battery Depletion	5
Estimated Active USA Implants	2,204	Other	1
Normal Battery Depletions	973	**Therapy Function Compromised**	**1**
		Possible Early Battery Depletion	1



Years	1	2	3	4	5	6	7	8	9	10	at 124 mo
Excluding NBD	100.0%	100.0%	100.0%	100.0%	99.9%	99.9%	99.9%	99.9%	99.9%	99.9%	99.9%
Including NBD	99.9%	99.8%	99.5%	98.0%	95.5%	91.2%	84.5%	74.1%	60.2%	43.1%	31.0%
Effective Sample Size	26186	23390	20951	18301	15665	13084	10292	6908	3651	958	218

C3TR01 Consulta CRT-P

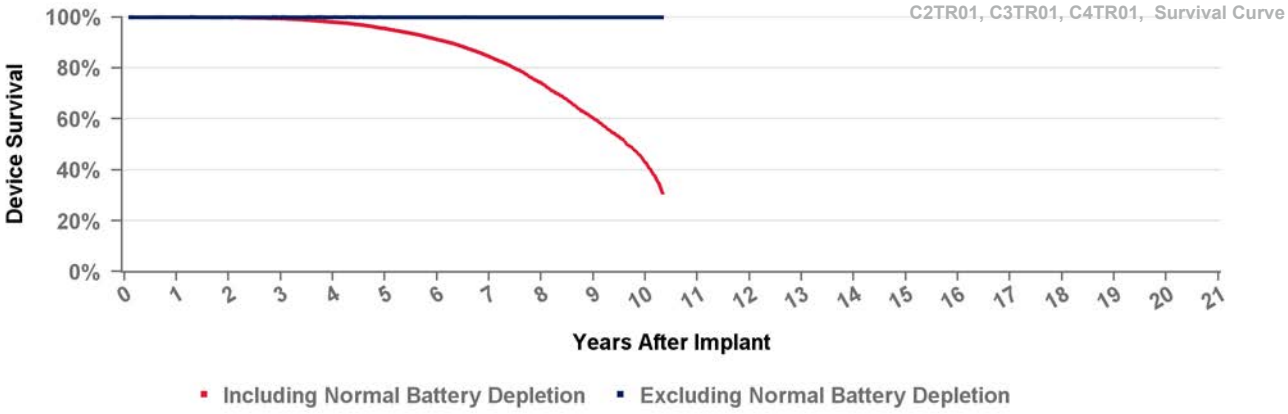
US Market Release		**Total Malfunctions (USA)**	
CE Approval Date	11May2010	**Therapy Function Not Compromised**	
Registered USA Implants			
Estimated Active USA Implants		**Therapy Function Compromised**	
Normal Battery Depletions			



Years	1	2	3	4	5	6	7	8	9	10	at 124 mo
Excluding NBD	100.0%	100.0%	100.0%	100.0%	99.9%	99.9%	99.9%	99.9%	99.9%	99.9%	99.9%
Including NBD	99.9%	99.8%	99.5%	98.0%	95.5%	91.2%	84.5%	74.1%	60.2%	43.1%	31.0%
Effective Sample Size	26186	23390	20951	18301	15665	13084	10292	6908	3651	958	218

C4TR01 Consulta CRT-P

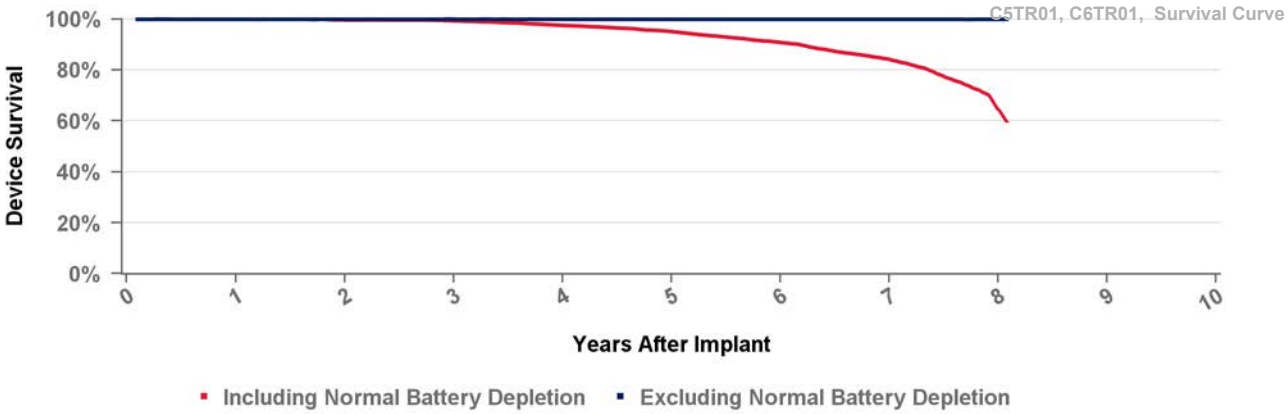
US Market Release	22Mar2011	**Total Malfunctions (USA)**	**8**
CE Approval Date		**Therapy Function Not Compromised**	**5**
Registered USA Implants	23,406	Possible Early Battery Depletion	5
Estimated Active USA Implants	5,796	**Therapy Function Compromised**	**3**
Normal Battery Depletions	2,222	Electrical Component	2
		Possible Early Battery Depletion	1



Years	1	2	3	4	5	6	7	8	9	10	at 124 mo
Excluding NBD	100.0%	100.0%	100.0%	100.0%	99.9%	99.9%	99.9%	99.9%	99.9%	99.9%	99.9%
Including NBD	99.9%	99.8%	99.5%	98.0%	95.5%	91.2%	84.5%	74.1%	60.2%	43.1%	31.0%
Effective Sample Size	26186	23390	20951	18301	15665	13084	10292	6908	3651	958	218

C5TR01 Viva CRT-P

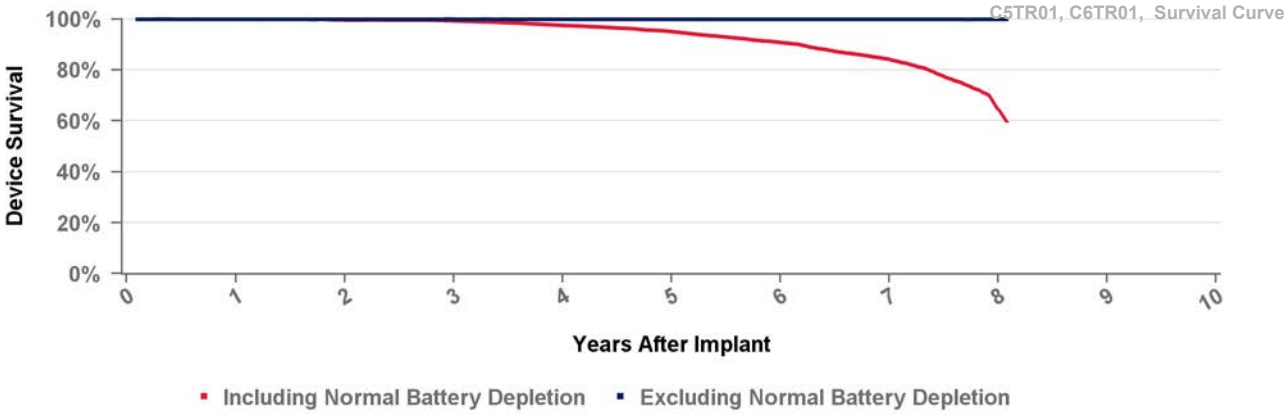
US Market Release		**Total Malfunctions (USA)**	
CE Approval Date	04Apr2014	**Therapy Function Not Compromised**	
Registered USA Implants			
Estimated Active USA Implants		**Therapy Function Compromised**	
Normal Battery Depletions			



Years	1	2	3	4	5	6	7	8	at 97 mo
Excluding NBD	100.0%	100.0%	100.0%	99.9%	99.9%	99.9%	99.9%	99.8%	99.8%
Including NBD	99.9%	99.7%	99.3%	97.5%	95.1%	90.8%	84.1%	64.7%	59.8%
Effective Sample Size	7364	6603	5917	5148	4408	3633	2422	359	210

C6TR01 Viva CRT-P

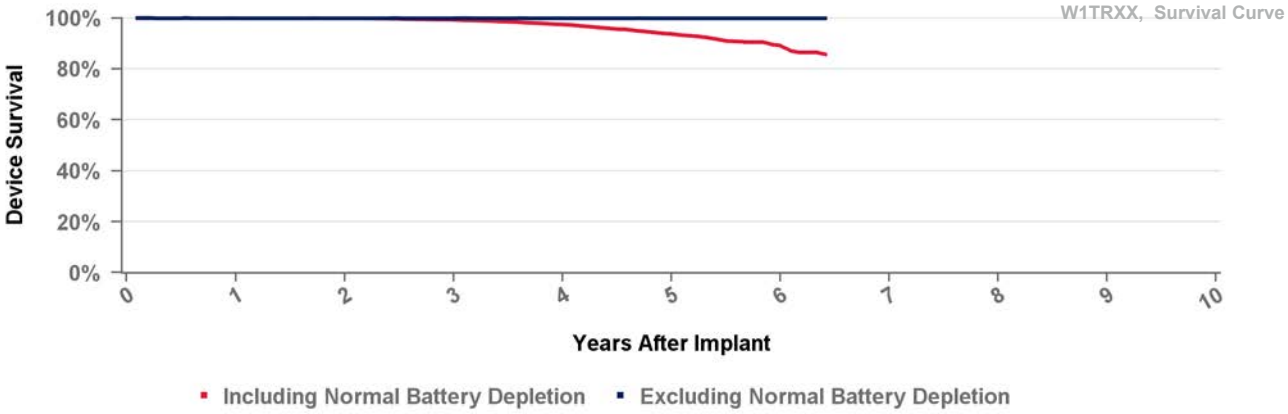
US Market Release	09Jul2014	**Total Malfunctions (USA)**	**8**
CE Approval Date		**Therapy Function Not Compromised**	**8**
Registered USA Implants	9,200	Electrical Component	2
Estimated Active USA Implants	3,965	Possible Early Battery Depletion	6
Normal Battery Depletions	560	**Therapy Function Compromised**	**0**



Years	1	2	3	4	5	6	7	8	at 97 mo
Excluding NBD	100.0%	100.0%	100.0%	99.9%	99.9%	99.9%	99.9%	99.8%	99.8%
Including NBD	99.9%	99.7%	99.3%	97.5%	95.1%	90.8%	84.1%	64.7%	59.8%
Effective Sample Size	7364	6603	5917	5148	4408	3633	2422	359	210

W1TR01 Percepta CRTP MRI

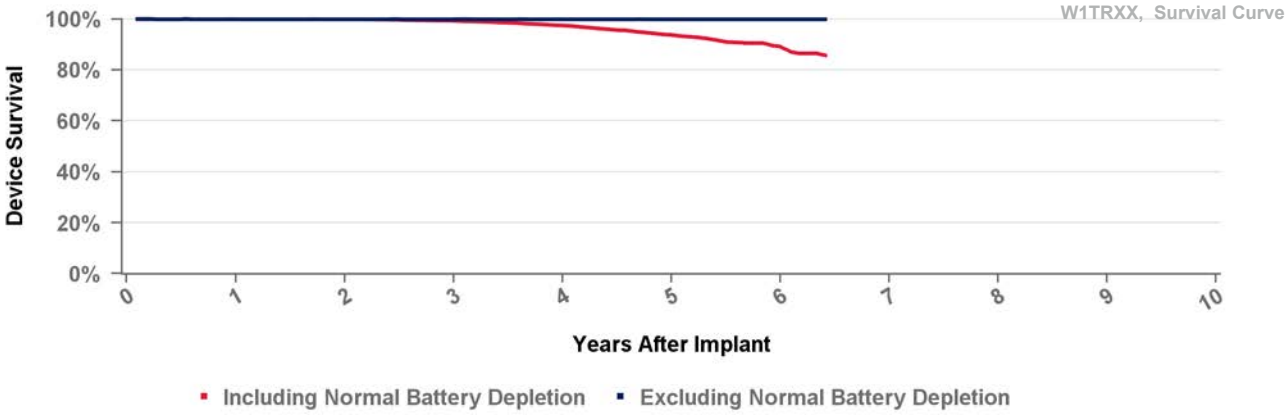
US Market Release	06May2017	**Total Malfunctions (USA)**	**6**
CE Approval Date		**Therapy Function Not Compromised**	**4**
Registered USA Implants	16,233	Electrical Component	2
Estimated Active USA Implants	13,720	Possible Early Battery Depletion	1
Normal Battery Depletions	124	Other	1
		Therapy Function Compromised	**2**
		Electrical Component	2



Years	1	2	3	4	5	6	at 77 mo
Excluding NBD	100.0%	100.0%	100.0%	99.9%	99.9%	99.9%	99.9%
Including NBD	99.9%	99.9%	99.3%	97.5%	93.8%	89.2%	85.7%
Effective Sample Size	16874	12537	8719	5361	2581	555	107

W1TR02 Serena CRTP MRI

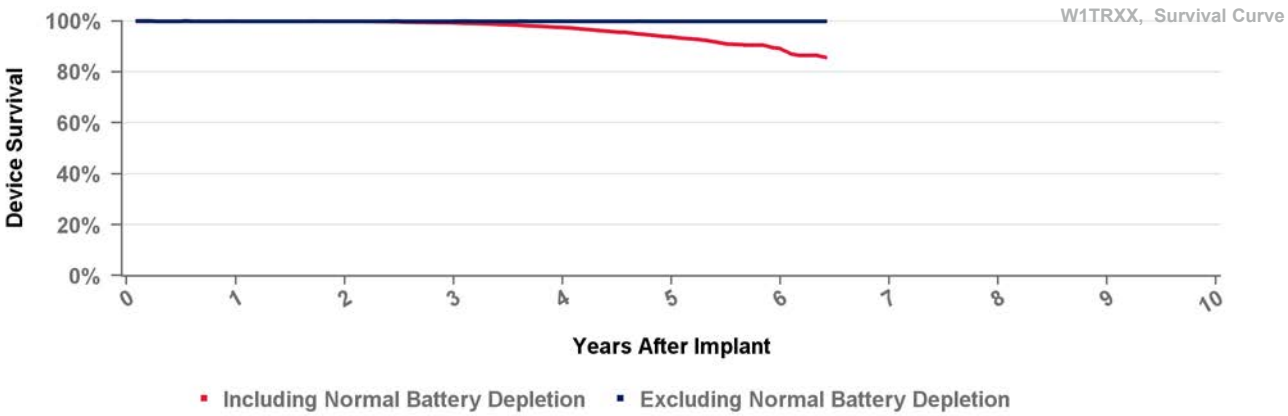
US Market Release	06May2017	**Total Malfunctions (USA)**	**3**
CE Approval Date		**Therapy Function Not Compromised**	**3**
Registered USA Implants	3,029	Electrical Component	2
Estimated Active USA Implants	2,471	Other	1
Normal Battery Depletions	35	**Therapy Function Compromised**	**0**



Years	1	2	3	4	5	6	at 77 mo
Excluding NBD	100.0%	100.0%	100.0%	99.9%	99.9%	99.9%	99.9%
Including NBD	99.9%	99.9%	99.3%	97.5%	93.8%	89.2%	85.7%
Effective Sample Size	16874	12537	8719	5361	2581	555	107

W1TR03 Solara CRTP MRI

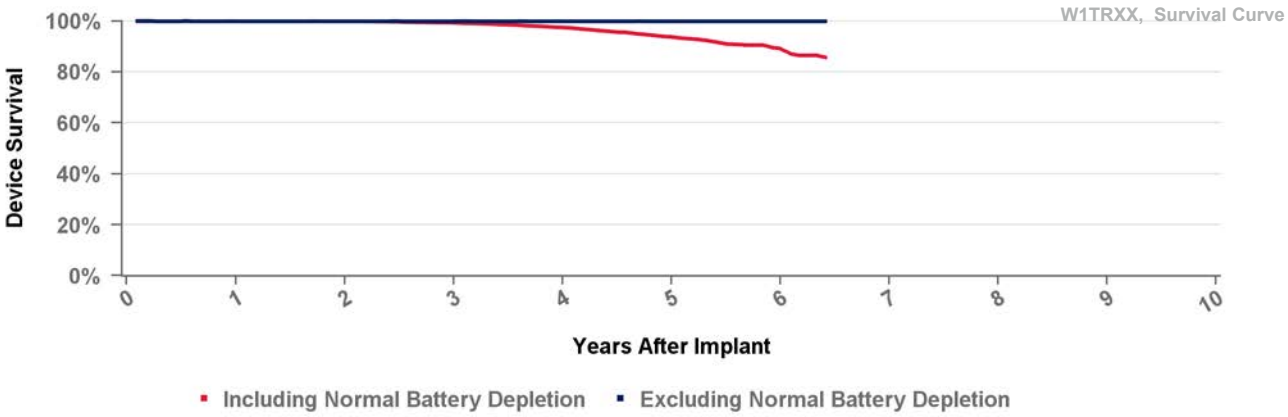
US Market Release	06May2017	**Total Malfunctions (USA)**	**2**
CE Approval Date		**Therapy Function Not Compromised**	**2**
Registered USA Implants	3,897	Electrical Component	1
Estimated Active USA Implants	2,990	Possible Early Battery Depletion	1
Normal Battery Depletions	61	**Therapy Function Compromised**	**0**



Years	1	2	3	4	5	6	at 77 mo
Excluding NBD	100.0%	100.0%	100.0%	99.9%	99.9%	99.9%	99.9%
Including NBD	99.9%	99.9%	99.3%	97.5%	93.8%	89.2%	85.7%
Effective Sample Size	16874	12537	8719	5361	2581	555	107

W1TR04 Percepta CRTP MRI

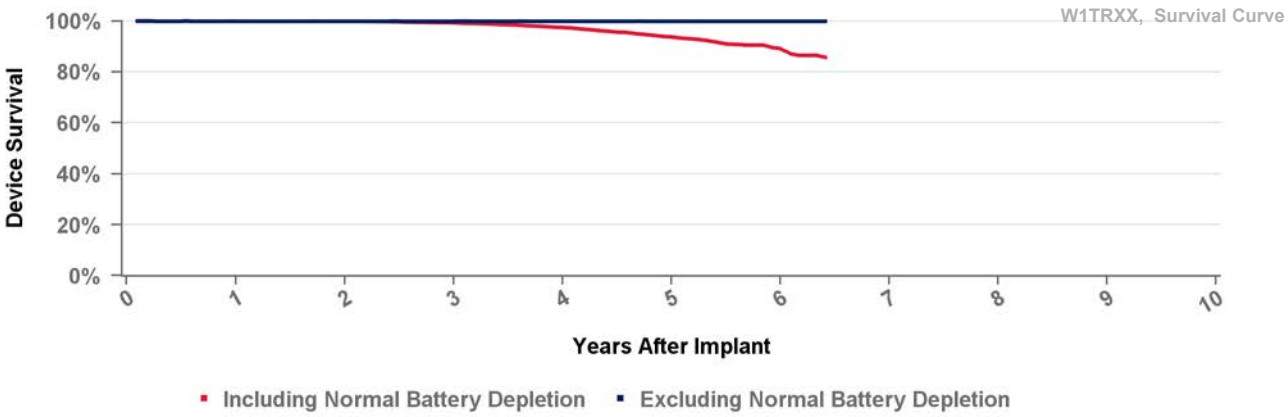
US Market Release		**Total Malfunctions (USA)**	
CE Approval Date	10Feb2017	**Therapy Function Not Compromised**	
Registered USA Implants			
Estimated Active USA Implants		**Therapy Function Compromised**	
Normal Battery Depletions			



Years	1	2	3	4	5	6	at 77 mo
Excluding NBD	100.0%	100.0%	100.0%	99.9%	99.9%	99.9%	99.9%
Including NBD	99.9%	99.9%	99.3%	97.5%	93.8%	89.2%	85.7%
Effective Sample Size	16874	12537	8719	5361	2581	555	107

W1TR05 Serena CRTP MRI

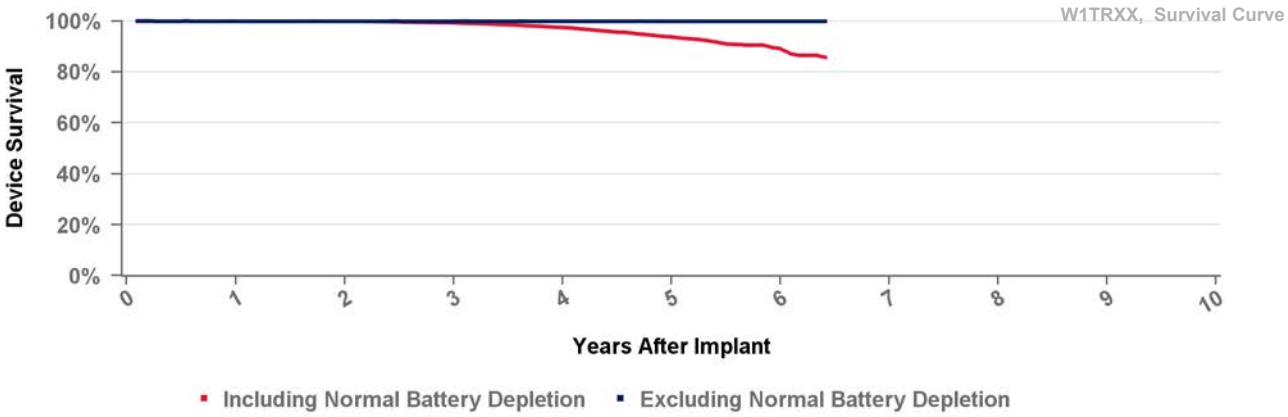
US Market Release		**Total Malfunctions (USA)**	
CE Approval Date	10Feb2017	**Therapy Function Not Compromised**	
Registered USA Implants	1		
Estimated Active USA Implants		**Therapy Function Compromised**	
Normal Battery Depletions			



Years	1	2	3	4	5	6	at 77 mo
Excluding NBD	100.0%	100.0%	100.0%	99.9%	99.9%	99.9%	99.9%
Including NBD	99.9%	99.9%	99.3%	97.5%	93.8%	89.2%	85.7%
Effective Sample Size	16874	12537	8719	5361	2581	555	107

W1TR06 Solara CRTP MRI

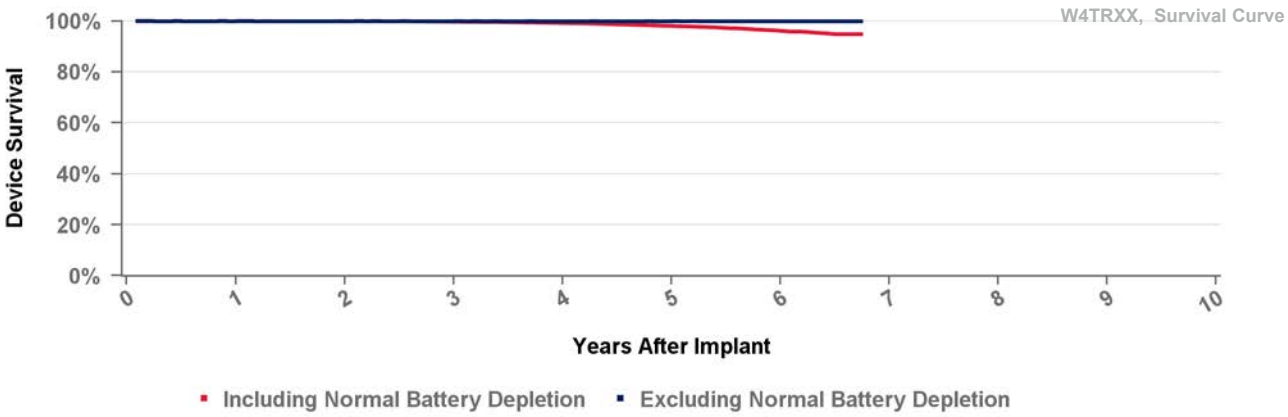
US Market Release		**Total Malfunctions (USA)**	
CE Approval Date	10Feb2017	**Therapy Function Not Compromised**	
Registered USA Implants			
Estimated Active USA Implants		**Therapy Function Compromised**	
Normal Battery Depletions			



Years	1	2	3	4	5	6	at 77 mo
Excluding NBD	100.0%	100.0%	100.0%	99.9%	99.9%	99.9%	99.9%
Including NBD	99.9%	99.9%	99.3%	97.5%	93.8%	89.2%	85.7%
Effective Sample Size	16874	12537	8719	5361	2581	555	107

W4TR01 Percepta Quad CRTP MRI SureScan

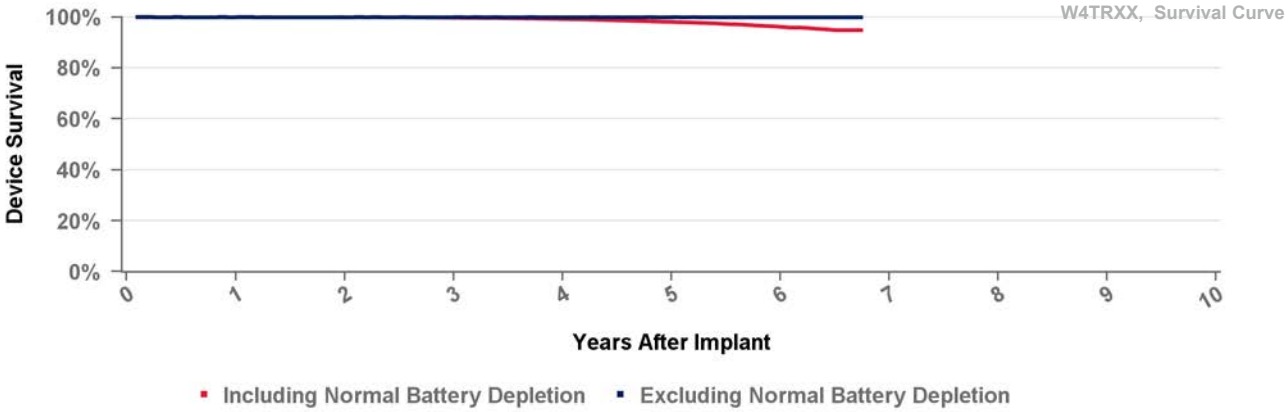
US Market Release	06May2017	**Total Malfunctions (USA)**	**13**
CE Approval Date		**Therapy Function Not Compromised**	**12**
Registered USA Implants	57,062	Electrical Component	10
Estimated Active USA Implants	48,649	Possible Early Battery Depletion	1
Normal Battery Depletions	191	Other	1
		Therapy Function Compromised	**1**
		Electrical Component	1



Years	1	2	3	4	5	6	at 81 mo
Excluding NBD	100.0%	100.0%	100.0%	100.0%	100.0%	99.9%	99.9%
Including NBD	100.0%	100.0%	99.8%	99.2%	98.1%	96.2%	94.8%
Effective Sample Size	56447	42374	29881	19174	10506	3616	111

W4TR02 Serena Quad CRTP MRI SureScan

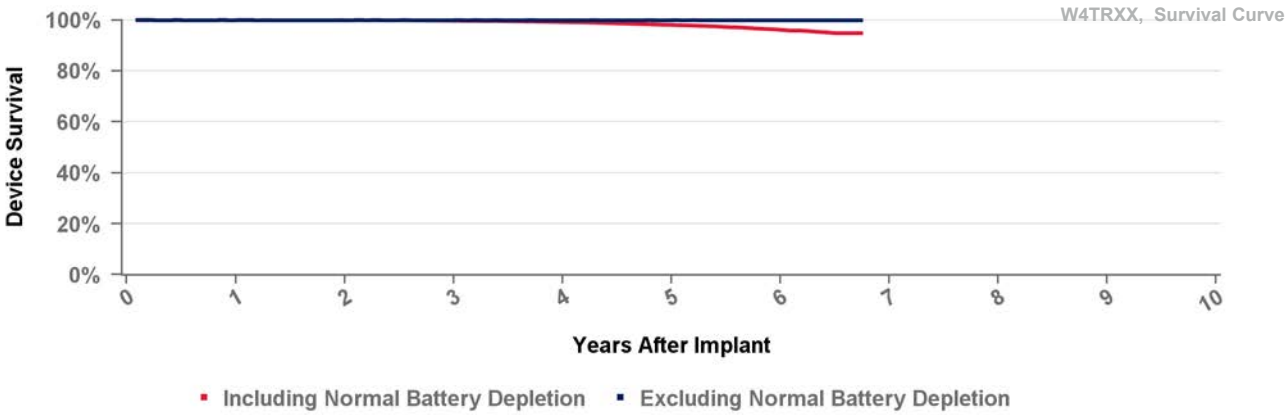
US Market Release	06May2017	**Total Malfunctions (USA)**	**2**
CE Approval Date		**Therapy Function Not Compromised**	**2**
Registered USA Implants	8,206	Electrical Component	2
Estimated Active USA Implants	6,710	**Therapy Function Compromised**	**0**
Normal Battery Depletions	37		



Years	1	2	3	4	5	6	at 81 mo
Excluding NBD	100.0%	100.0%	100.0%	100.0%	100.0%	99.9%	99.9%
Including NBD	100.0%	100.0%	99.8%	99.2%	98.1%	96.2%	94.8%
Effective Sample Size	56447	42374	29881	19174	10506	3616	111

W4TR03 Solara Quad CRTP MRI SureScan

US Market Release	06May2017	**Total Malfunctions (USA)**	**5**
CE Approval Date		**Therapy Function Not Compromised**	**2**
Registered USA Implants	10,292	Electrical Component	2
Estimated Active USA Implants	8,093	**Therapy Function Compromised**	**3**
Normal Battery Depletions	53	Electrical Component	2
		Possible Early Battery Depletion	1

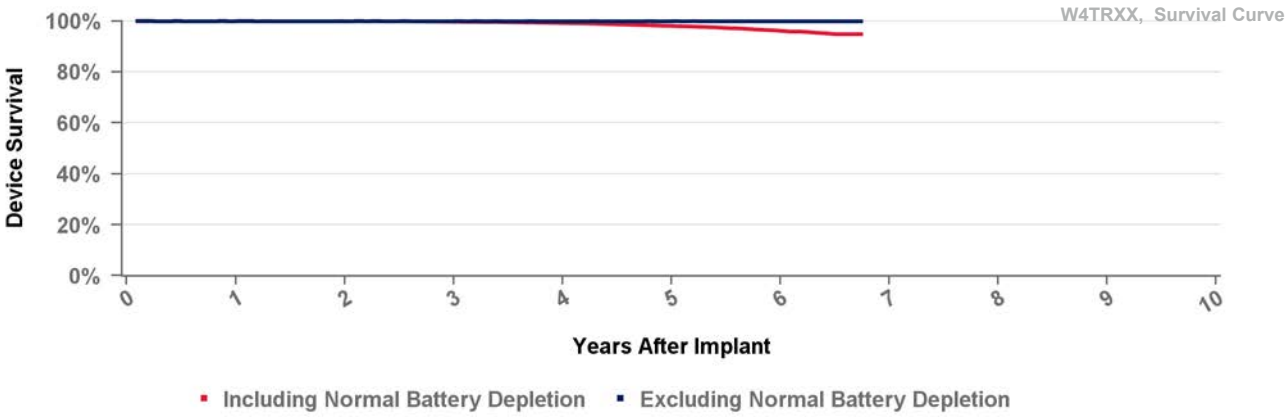


Years	1	2	3	4	5	6	at 81 mo
Excluding NBD	100.0%	100.0%	100.0%	100.0%	100.0%	99.9%	99.9%
Including NBD	100.0%	100.0%	99.8%	99.2%	98.1%	96.2%	94.8%
Effective Sample Size	56447	42374	29881	19174	10506	3616	111

W4TR04 Percepta Quad CRT-P MRI SureScan

US Market Release
CE Approval Date 10Feb2017
Registered USA Implants
Estimated Active USA Implants
Normal Battery Depletions

Total Malfunctions (USA)
Therapy Function Not Compromised
Therapy Function Compromised

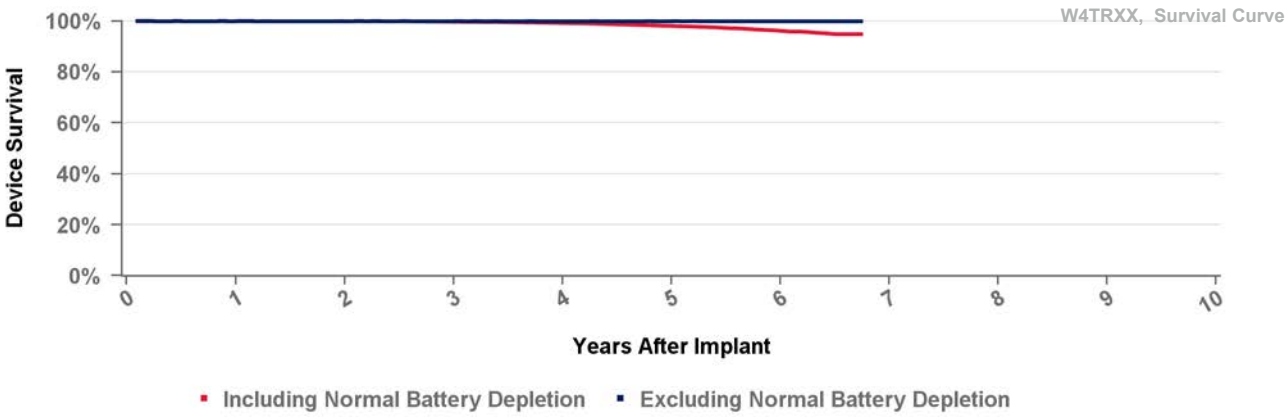


Years	1	2	3	4	5	6	at 81 mo
Excluding NBD	100.0%	100.0%	100.0%	100.0%	100.0%	99.9%	99.9%
Including NBD	100.0%	100.0%	99.8%	99.2%	98.1%	96.2%	94.8%
Effective Sample Size	56447	42374	29881	19174	10506	3616	111

W4TR05 Serena Quad CRTP MRI SureScan

US Market Release
CE Approval Date 10Feb2017
Registered USA Implants
Estimated Active USA Implants
Normal Battery Depletions

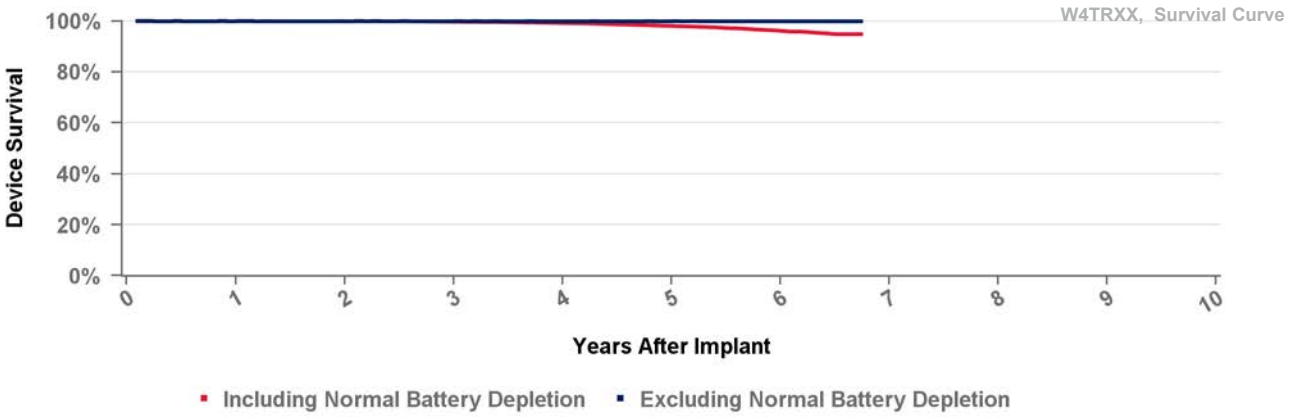
Total Malfunctions (USA)
Therapy Function Not Compromised
Therapy Function Compromised



Years	1	2	3	4	5	6	at 81 mo
Excluding NBD	100.0%	100.0%	100.0%	100.0%	100.0%	99.9%	99.9%
Including NBD	100.0%	100.0%	99.8%	99.2%	98.1%	96.2%	94.8%
Effective Sample Size	56447	42374	29881	19174	10506	3616	111

W4TR06 Solara Quad CRTP MRI SureScan

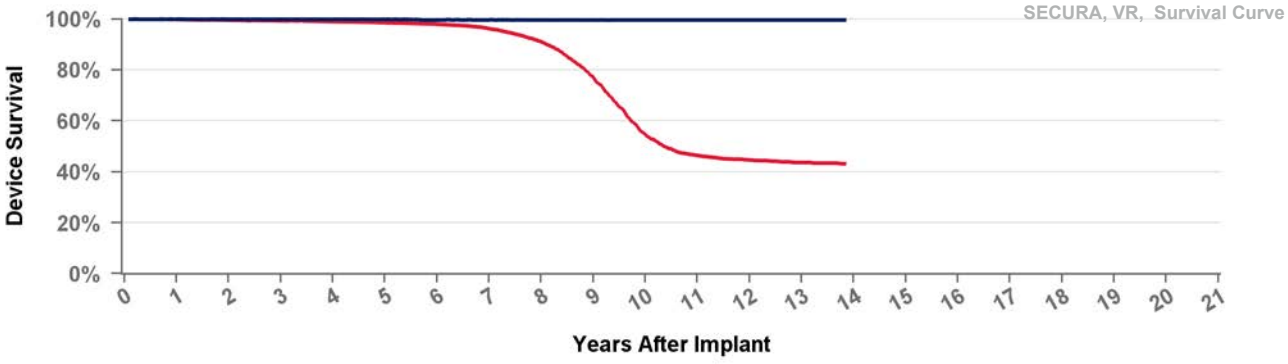
US Market Release		**Total Malfunctions (USA)**	
CE Approval Date	10Feb2017	**Therapy Function Not Compromised**	
Registered USA Implants			
Estimated Active USA Implants		**Therapy Function Compromised**	
Normal Battery Depletions			



Years	1	2	3	4	5	6	at 81 mo
Excluding NBD	100.0%	100.0%	100.0%	100.0%	100.0%	99.9%	99.9%
Including NBD	100.0%	100.0%	99.8%	99.2%	98.1%	96.2%	94.8%
Effective Sample Size	56447	42374	29881	19174	10506	3616	111

D214VRM Secura VR

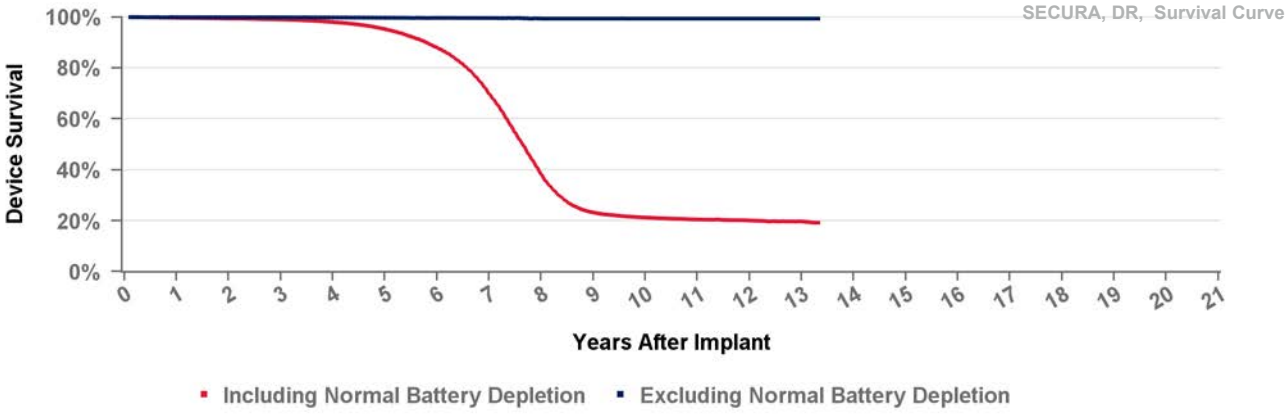
US Market Release		**Total Malfunctions (USA)**	
CE Approval Date	17Dec2010	**Therapy Function Not Compromised**	
Registered USA Implants			
Estimated Active USA Implants		**Therapy Function Compromised**	
Normal Battery Depletions			



Years	1	2	3	4	5	6	7	8	9	10	11	12	13	at 166 mo
Excluding NBD	100.0%	99.9%	99.9%	99.9%	99.8%	99.8%	99.7%	99.6%	99.6%	99.6%	99.6%	99.6%	99.6%	99.6%
Including NBD	99.8%	99.6%	99.3%	99.0%	98.6%	98.0%	96.2%	91.1%	77.0%	54.5%	46.4%	44.7%	43.6%	43.2%
Effective Sample Size	17638	16329	15176	14071	12958	11843	10611	8579	5562	2881	1954	1441	890	158

D224DRG Secura DR

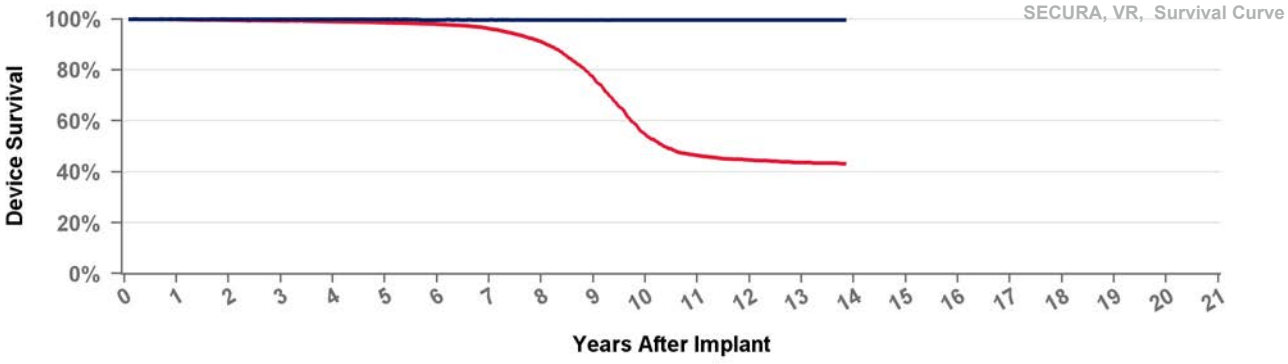
US Market Release	15Sep2008	**Total Malfunctions (USA)**	**152**
CE Approval Date		**Therapy Function Not Compromised**	**114**
Registered USA Implants	49,638	Battery	14
Estimated Active USA Implants	5,358	Electrical Component	38
Normal Battery Depletions	10,337	Possible Early Battery Depletion	50
		Software/Firmware	8
		Other	4
		Therapy Function Compromised	**38**
		Battery	21
		Electrical Component	13
		Possible Early Battery Depletion	1
		Software/Firmware	2
		Other	1



Years	1	2	3	4	5	6	7	8	9	10	11	12	13	at 160 mo
Excluding NBD	100.0%	99.9%	99.9%	99.8%	99.7%	99.7%	99.6%	99.4%	99.4%	99.4%	99.4%	99.4%	99.4%	99.4%
Including NBD	99.7%	99.4%	99.0%	98.0%	95.2%	87.9%	70.0%	38.4%	23.3%	21.3%	20.5%	20.1%	19.7%	19.2%
Effective Sample Size	44542	41188	38108	34986	31060	25094	16336	6726	3268	2720	2276	1737	855	195

D234VRC Secura VR

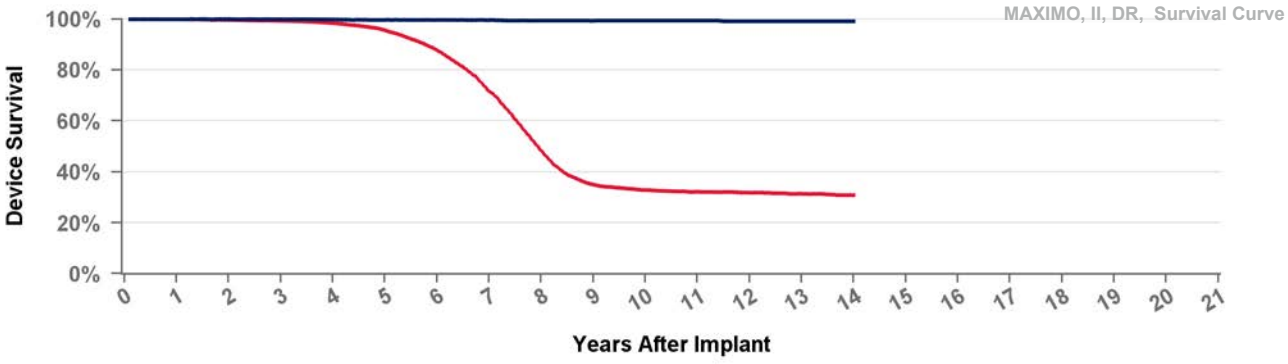
US Market Release		**Total Malfunctions (USA)**	
CE Approval Date	14Mar2008	**Therapy Function Not Compromised**	
Registered USA Implants			
Estimated Active USA Implants		**Therapy Function Compromised**	
Normal Battery Depletions			



Years	1	2	3	4	5	6	7	8	9	10	11	12	13	at 166 mo
Excluding NBD	100.0%	99.9%	99.9%	99.9%	99.8%	99.8%	99.7%	99.6%	99.6%	99.6%	99.6%	99.6%	99.6%	99.6%
Including NBD	99.8%	99.6%	99.3%	99.0%	98.6%	98.0%	96.2%	91.1%	77.0%	54.5%	46.4%	44.7%	43.6%	43.2%
Effective Sample Size	17638	16329	15176	14071	12958	11843	10611	8579	5562	2881	1954	1441	890	158

D264DRM Maximo II DR

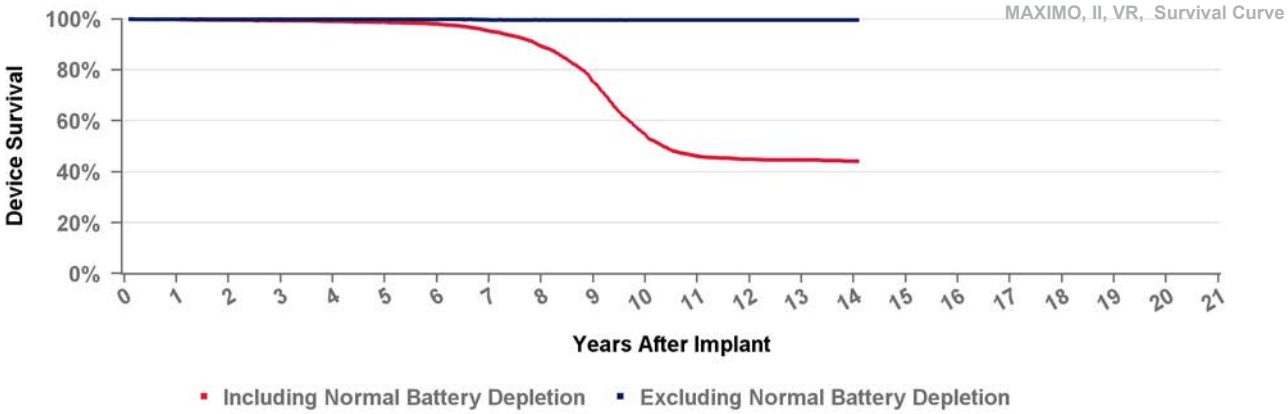
US Market Release	09Jan2012	**Total Malfunctions (USA)**	
CE Approval Date	22Jul2010	**Therapy Function Not Compromised**	
Registered USA Implants	6		
Estimated Active USA Implants		**Therapy Function Compromised**	
Normal Battery Depletions	2		



Years	1	2	3	4	5	6	7	8	9	10	11	12	13	at 168 mo
Excluding NBD	100.0%	100.0%	99.9%	99.8%	99.7%	99.7%	99.5%	99.3%	99.3%	99.3%	99.3%	99.2%	99.2%	99.2%
Including NBD	99.9%	99.6%	99.3%	98.4%	95.6%	87.6%	71.7%	48.4%	35.0%	32.9%	32.2%	31.8%	31.4%	31.0%
Effective Sample Size	17237	15935	14784	13617	12098	9585	5995	2815	1732	1494	1302	1038	636	101

D264VRM Maximo II VR

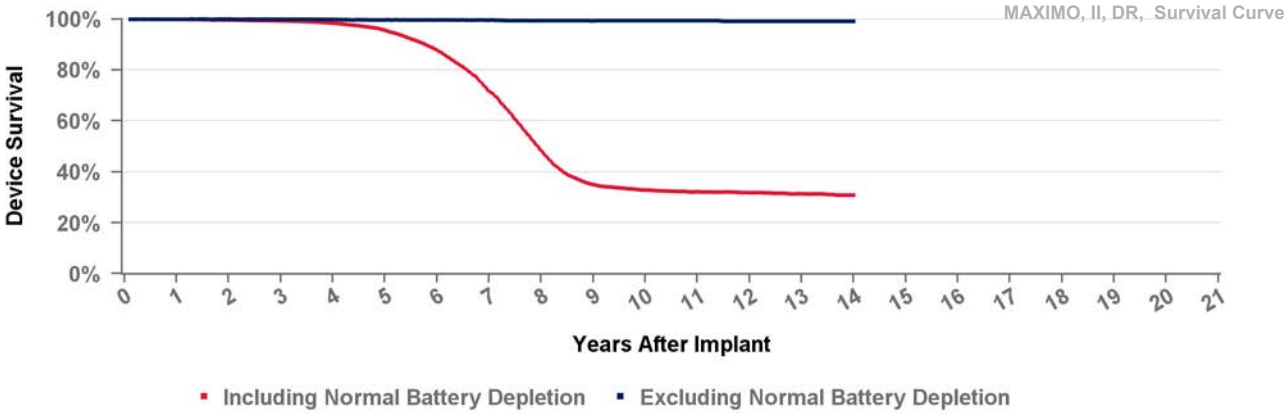
US Market Release	02May2012	**Total Malfunctions (USA)**	
CE Approval Date	17Dec2010	**Therapy Function Not Compromised**	
Registered USA Implants			
Estimated Active USA Implants		**Therapy Function Compromised**	
Normal Battery Depletions			



Years	1	2	3	4	5	6	7	8	9	10	11	12	13	14	at 169 mo
Excluding NBD	100.0%	99.9%	99.9%	99.9%	99.9%	99.8%	99.7%	99.7%	99.6%	99.6%	99.6%	99.6%	99.6%	99.6%	99.6%
Including NBD	99.8%	99.6%	99.4%	99.2%	98.8%	98.1%	95.3%	89.3%	75.3%	54.6%	46.1%	45.0%	44.6%	44.2%	44.2%
Effective Sample Size	10871	10124	9422	8722	8029	7336	6492	5259	3414	1859	1285	982	621	150	104

D284DRG Maximo II DR

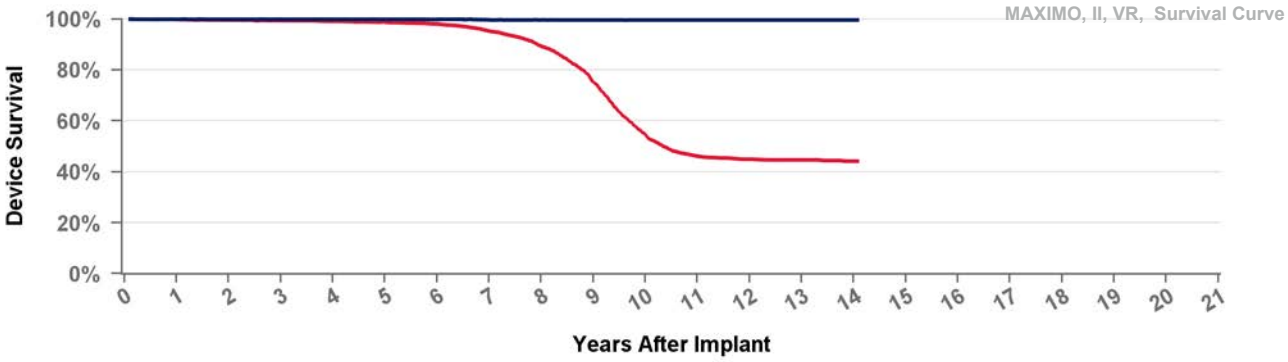
US Market Release	17Sep2008	**Total Malfunctions (USA)**	**71**
CE Approval Date	14Mar2008	**Therapy Function Not Compromised**	**54**
Registered USA Implants	19,956	Battery	7
Estimated Active USA Implants	2,350	Electrical Component	15
Normal Battery Depletions	3,647	Possible Early Battery Depletion	30
		Other	2
		Therapy Function Compromised	**17**
		Battery	11
		Electrical Component	5
		Possible Early Battery Depletion	1



Years	1	2	3	4	5	6	7	8	9	10	11	12	13	at 168 mo
Excluding NBD	100.0%	100.0%	99.9%	99.8%	99.7%	99.7%	99.5%	99.3%	99.3%	99.3%	99.3%	99.2%	99.2%	99.2%
Including NBD	99.9%	99.6%	99.3%	98.4%	95.6%	87.6%	71.7%	48.4%	35.0%	32.9%	32.2%	31.8%	31.4%	31.0%
Effective Sample Size	17237	15935	14784	13617	12098	9585	5995	2815	1732	1494	1302	1038	636	101

D284VRC Maximo II VR

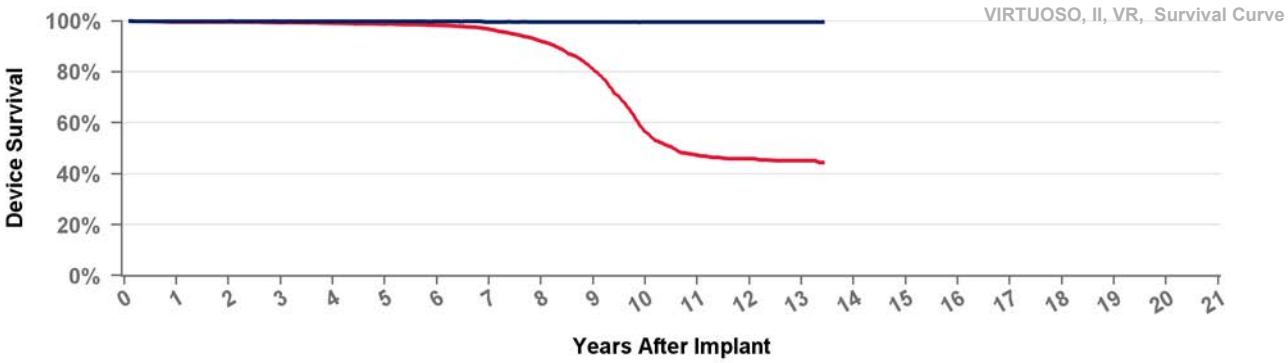
US Market Release	17Sep2008	**Total Malfunctions (USA)**	**32**
CE Approval Date	14Mar2008	**Therapy Function Not Compromised**	**22**
Registered USA Implants	12,860	Battery	10
Estimated Active USA Implants	2,081	Electrical Component	5
Normal Battery Depletions	1,618	Possible Early Battery Depletion	4
		Software/Firmware	3
		Therapy Function Compromised	**10**
		Battery	6
		Electrical Component	3
		Software/Firmware	1



Years	1	2	3	4	5	6	7	8	9	10	11	12	13	14	at 169 mo
Excluding NBD	100.0%	99.9%	99.9%	99.9%	99.9%	99.8%	99.7%	99.7%	99.6%	99.6%	99.6%	99.6%	99.6%	99.6%	99.6%
Including NBD	99.8%	99.6%	99.4%	99.2%	98.8%	98.1%	95.3%	89.3%	75.3%	54.6%	46.1%	45.0%	44.6%	44.2%	44.2%
Effective Sample Size	10871	10124	9422	8722	8029	7336	6492	5259	3414	1859	1285	982	621	150	104

D294VRC Virtuoso II VR

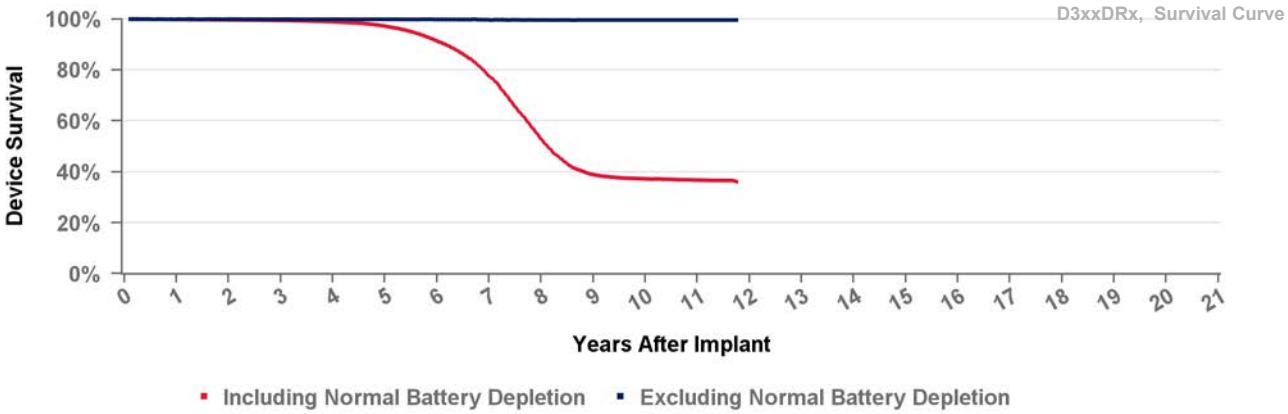
US Market Release		**Total Malfunctions (USA)**	
CE Approval Date	20Aug2008	**Therapy Function Not Compromised**	
Registered USA Implants			
Estimated Active USA Implants		**Therapy Function Compromised**	
Normal Battery Depletions			



Years	1	2	3	4	5	6	7	8	9	10	11	12	13	at 161 mo
Excluding NBD	100.0%	100.0%	99.9%	99.9%	99.9%	99.8%	99.7%	99.7%	99.7%	99.5%	99.5%	99.5%	99.5%	99.5%
Including NBD	99.7%	99.7%	99.4%	99.2%	98.8%	98.3%	96.8%	92.0%	80.8%	56.6%	47.3%	45.9%	45.1%	44.6%
Effective Sample Size	7678	7160	6653	6136	5663	5130	4569	3745	2495	1292	883	708	381	131

D314DRG Protecta XT DR

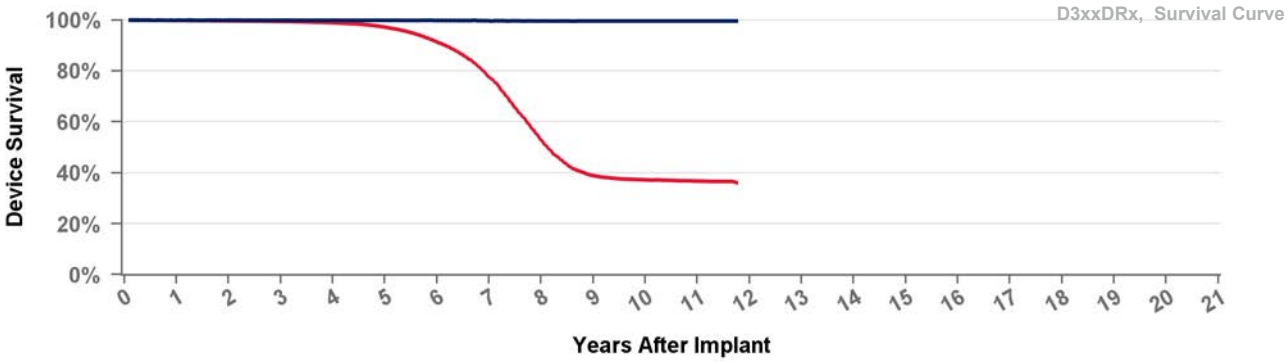
US Market Release	25Mar2011	**Total Malfunctions (USA)**	**77**
CE Approval Date		**Therapy Function Not Compromised**	**39**
Registered USA Implants	34,746	Battery	8
Estimated Active USA Implants	4,636	Electrical Component	25
Normal Battery Depletions	4,551	Electrical Interconnect	1
		Possible Early Battery Depletion	4
		Other	1
		Therapy Function Compromised	**38**
		Battery	30
		Electrical Component	8



Years	1	2	3	4	5	6	7	8	9	10	11	at 141 mo
Excluding NBD	100.0%	99.9%	99.9%	99.9%	99.9%	99.8%	99.7%	99.7%	99.6%	99.6%	99.6%	99.6%
Including NBD	99.8%	99.7%	99.5%	99.0%	97.2%	91.3%	77.6%	52.9%	38.9%	37.3%	36.8%	36.1%
Effective Sample Size	54186	50303	46255	42263	37894	31014	20482	9364	5256	4478	2782	122

D314DRM Protecta XT DR

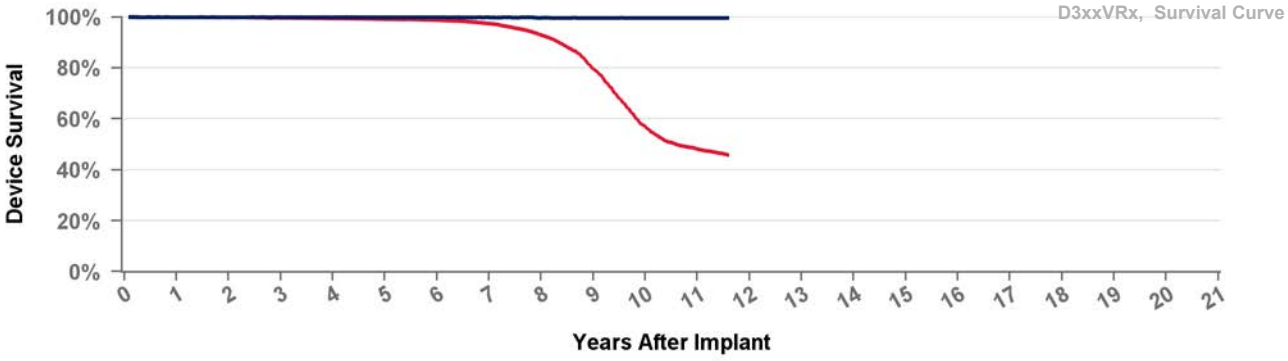
US Market Release	09Nov2011	**Total Malfunctions (USA)**	**25**
CE Approval Date		**Therapy Function Not Compromised**	**17**
Registered USA Implants	13,913	Battery	3
Estimated Active USA Implants	2,198	Electrical Component	12
Normal Battery Depletions	1,928	Other	2
		Therapy Function Compromised	**8**
		Battery	7
		Electrical Component	1



Years	1	2	3	4	5	6	7	8	9	10	11	at 141 mo
Excluding NBD	100.0%	99.9%	99.9%	99.9%	99.9%	99.8%	99.7%	99.7%	99.6%	99.6%	99.6%	99.6%
Including NBD	99.8%	99.7%	99.5%	99.0%	97.2%	91.3%	77.6%	52.9%	38.9%	37.3%	36.8%	36.1%
Effective Sample Size	54186	50303	46255	42263	37894	31014	20482	9364	5256	4478	2782	122

D314VRG Protecta XT VR

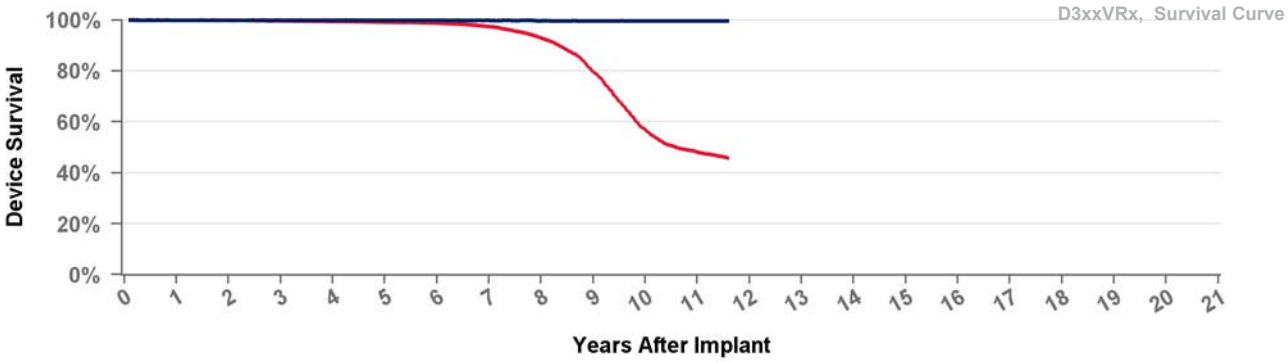
US Market Release	25Mar2011	**Total Malfunctions (USA)**	**31**
CE Approval Date		**Therapy Function Not Compromised**	**20**
Registered USA Implants	14,091	Battery	11
Estimated Active USA Implants	2,749	Electrical Component	8
Normal Battery Depletions	1,245	Other	1
		Therapy Function Compromised	**11**
		Battery	9
		Electrical Component	2



Years	1	2	3	4	5	6	7	8	9	10	11	at 139 mo
Excluding NBD	100.0%	100.0%	100.0%	99.9%	99.9%	99.9%	99.8%	99.8%	99.7%	99.7%	99.7%	99.7%
Including NBD	99.9%	99.9%	99.7%	99.5%	99.2%	98.8%	97.4%	92.9%	79.7%	56.8%	48.1%	45.8%
Effective Sample Size	25804	23984	22243	20574	19021	17447	15688	13081	8453	4069	1831	170

D314VRM Protecta XT VR

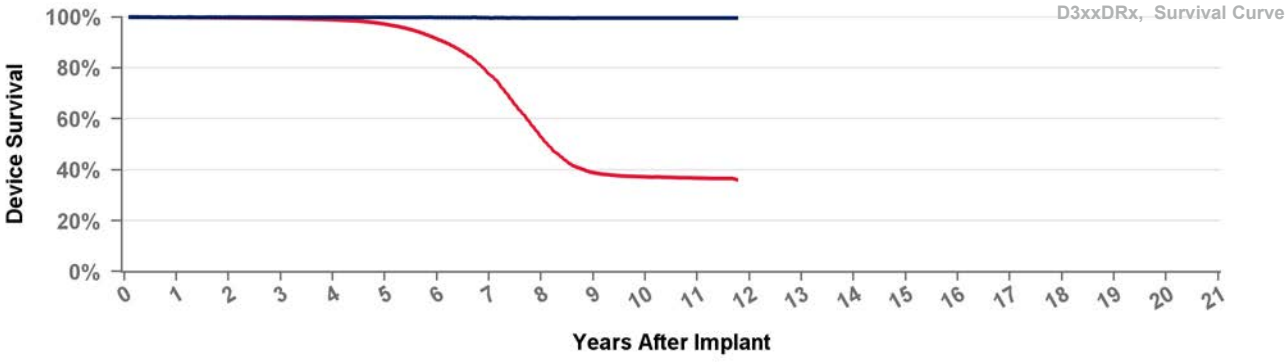
US Market Release	02May2012	**Total Malfunctions (USA)**	**8**
CE Approval Date		**Therapy Function Not Compromised**	**4**
Registered USA Implants	7,334	Battery	1
Estimated Active USA Implants	1,613	Electrical Component	2
Normal Battery Depletions	738	Possible Early Battery Depletion	1
		Therapy Function Compromised	**4**
		Battery	2
		Electrical Component	2



Years	1	2	3	4	5	6	7	8	9	10	11	at 139 mo
Excluding NBD	100.0%	100.0%	100.0%	99.9%	99.9%	99.9%	99.8%	99.8%	99.7%	99.7%	99.7%	99.7%
Including NBD	99.9%	99.9%	99.7%	99.5%	99.2%	98.8%	97.4%	92.9%	79.7%	56.8%	48.1%	45.8%
Effective Sample Size	25804	23984	22243	20574	19021	17447	15688	13081	8453	4069	1831	170

D354DRG Protecta XT DR

US Market Release		**Total Malfunctions (USA)**	
CE Approval Date	25Mar2010	**Therapy Function Not Compromised**	
Registered USA Implants	2		
Estimated Active USA Implants		**Therapy Function Compromised**	
Normal Battery Depletions	1		

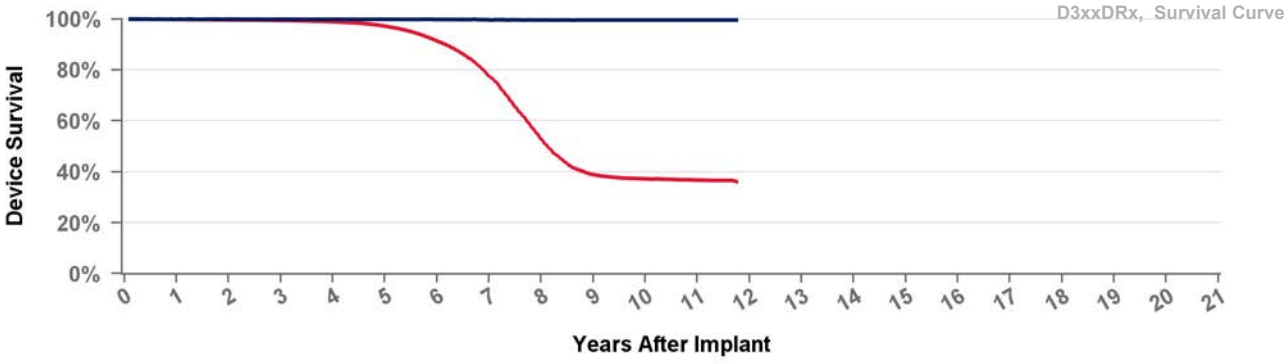


Years	1	2	3	4	5	6	7	8	9	10	11	at 141 mo
Excluding NBD	100.0%	99.9%	99.9%	99.9%	99.9%	99.8%	99.7%	99.7%	99.6%	99.6%	99.6%	99.6%
Including NBD	99.8%	99.7%	99.5%	99.0%	97.2%	91.3%	77.6%	52.9%	38.9%	37.3%	36.8%	36.1%
Effective Sample Size	54186	50303	46255	42263	37894	31014	20482	9364	5256	4478	2782	122

D354DRM Protecta XT DR

US Market Release
CE Approval Date 15Jul2010
Registered USA Implants
Estimated Active USA Implants
Normal Battery Depletions

Total Malfunctions (USA)
Therapy Function Not Compromised
Therapy Function Compromised

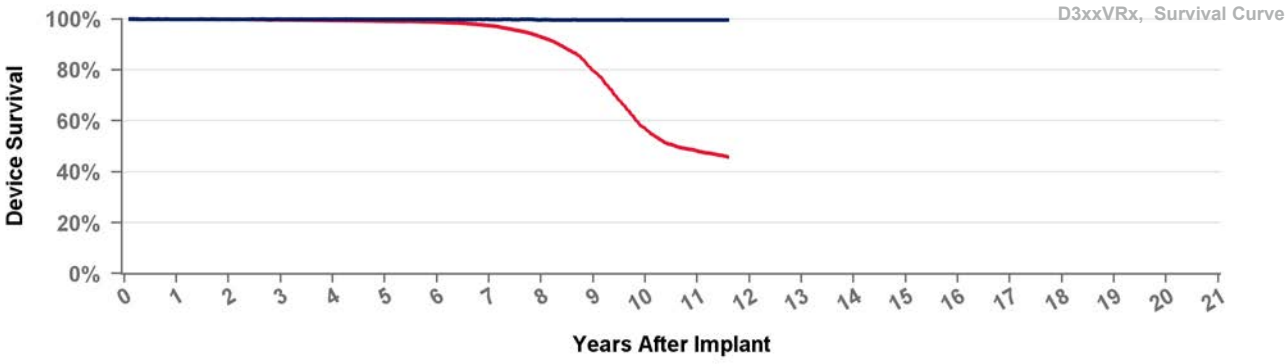


Years	1	2	3	4	5	6	7	8	9	10	11	at 141 mo
Excluding NBD	100.0%	99.9%	99.9%	99.9%	99.9%	99.8%	99.7%	99.7%	99.6%	99.6%	99.6%	99.6%
Including NBD	99.8%	99.7%	99.5%	99.0%	97.2%	91.3%	77.6%	52.9%	38.9%	37.3%	36.8%	36.1%
Effective Sample Size	54186	50303	46255	42263	37894	31014	20482	9364	5256	4478	2782	122

D354VRG Protecta XT VR

US Market Release
CE Approval Date 25Mar2010
Registered USA Implants
Estimated Active USA Implants
Normal Battery Depletions

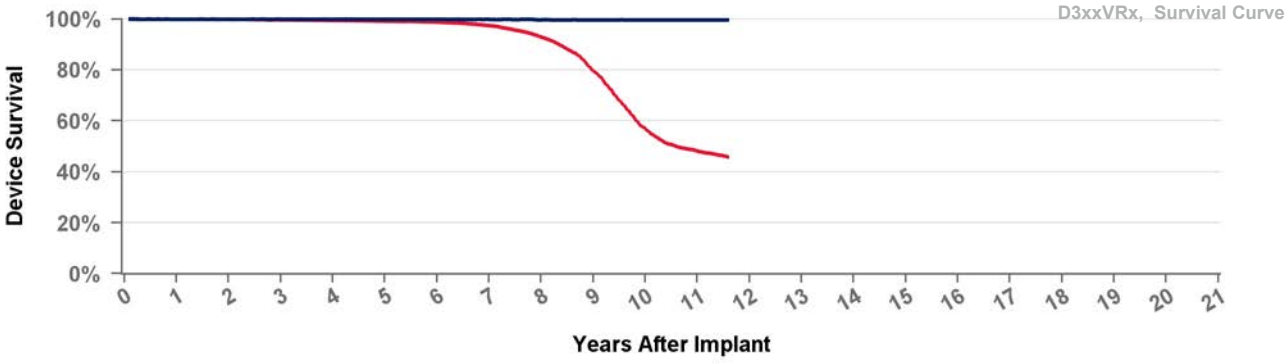
Total Malfunctions (USA)
Therapy Function Not Compromised
Therapy Function Compromised



Years	1	2	3	4	5	6	7	8	9	10	11	at 139 mo
Excluding NBD	100.0%	100.0%	100.0%	99.9%	99.9%	99.9%	99.8%	99.8%	99.7%	99.7%	99.7%	99.7%
Including NBD	99.9%	99.9%	99.7%	99.5%	99.2%	98.8%	97.4%	92.9%	79.7%	56.8%	48.1%	45.8%
Effective Sample Size	25804	23984	22243	20574	19021	17447	15688	13081	8453	4069	1831	170

D354VRM Protecta XT VR

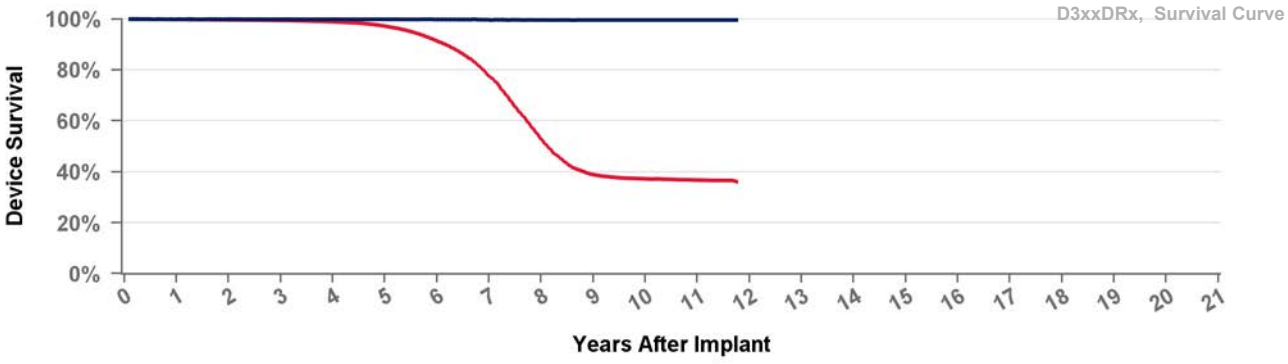
US Market Release		**Total Malfunctions (USA)**	
CE Approval Date	17Dec2010	**Therapy Function Not Compromised**	
Registered USA Implants	1		
Estimated Active USA Implants		**Therapy Function Compromised**	
Normal Battery Depletions			



Years	1	2	3	4	5	6	7	8	9	10	11	at 139 mo
Excluding NBD	100.0%	100.0%	100.0%	99.9%	99.9%	99.9%	99.8%	99.8%	99.7%	99.7%	99.7%	99.7%
Including NBD	99.9%	99.9%	99.7%	99.5%	99.2%	98.8%	97.4%	92.9%	79.7%	56.8%	48.1%	45.8%
Effective Sample Size	25804	23984	22243	20574	19021	17447	15688	13081	8453	4069	1831	170

D364DRG Protecta DR

US Market Release		**Total Malfunctions (USA)**	
CE Approval Date	25Mar2010	**Therapy Function Not Compromised**	
Registered USA Implants	1		
Estimated Active USA Implants		**Therapy Function Compromised**	
Normal Battery Depletions			

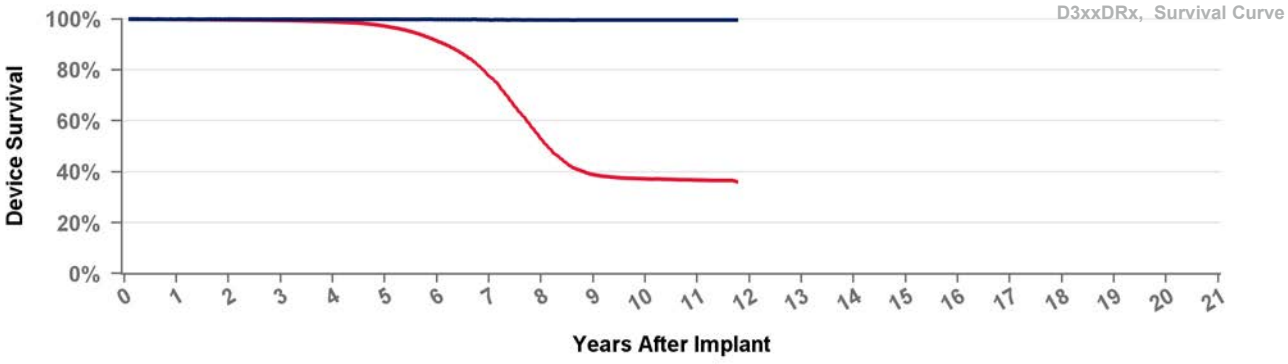


Years	1	2	3	4	5	6	7	8	9	10	11	at 141 mo
Excluding NBD	100.0%	99.9%	99.9%	99.9%	99.9%	99.8%	99.7%	99.7%	99.6%	99.6%	99.6%	99.6%
Including NBD	99.8%	99.7%	99.5%	99.0%	97.2%	91.3%	77.6%	52.9%	38.9%	37.3%	36.8%	36.1%
Effective Sample Size	54186	50303	46255	42263	37894	31014	20482	9364	5256	4478	2782	122

D364DRM Protecta DR

US Market Release
CE Approval Date 15Jul2010
Registered USA Implants
Estimated Active USA Implants
Normal Battery Depletions

Total Malfunctions (USA)
Therapy Function Not Compromised
Therapy Function Compromised

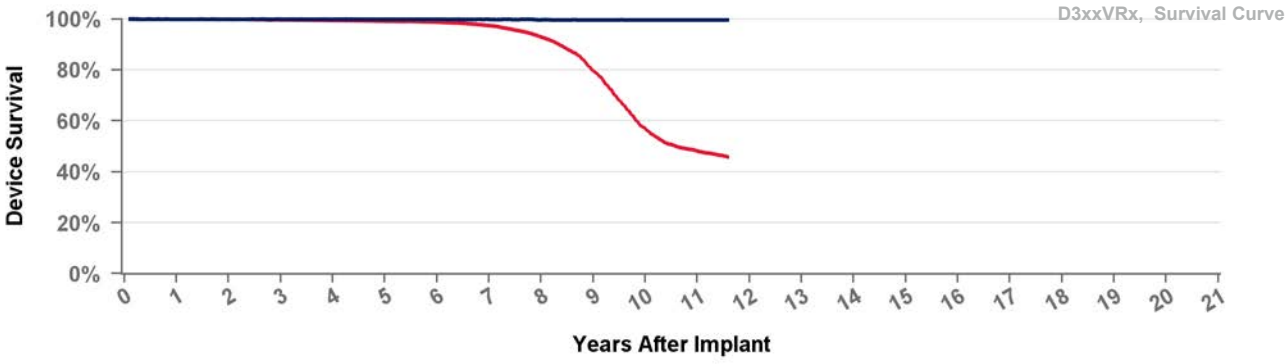


Years	1	2	3	4	5	6	7	8	9	10	11	at 141 mo
Excluding NBD	100.0%	99.9%	99.9%	99.9%	99.9%	99.8%	99.7%	99.7%	99.6%	99.6%	99.6%	99.6%
Including NBD	99.8%	99.7%	99.5%	99.0%	97.2%	91.3%	77.6%	52.9%	38.9%	37.3%	36.8%	36.1%
Effective Sample Size	54186	50303	46255	42263	37894	31014	20482	9364	5256	4478	2782	122

D364VRG Protecta VR

US Market Release
CE Approval Date 25Mar2010
Registered USA Implants
Estimated Active USA Implants
Normal Battery Depletions

Total Malfunctions (USA)
Therapy Function Not Compromised
Therapy Function Compromised



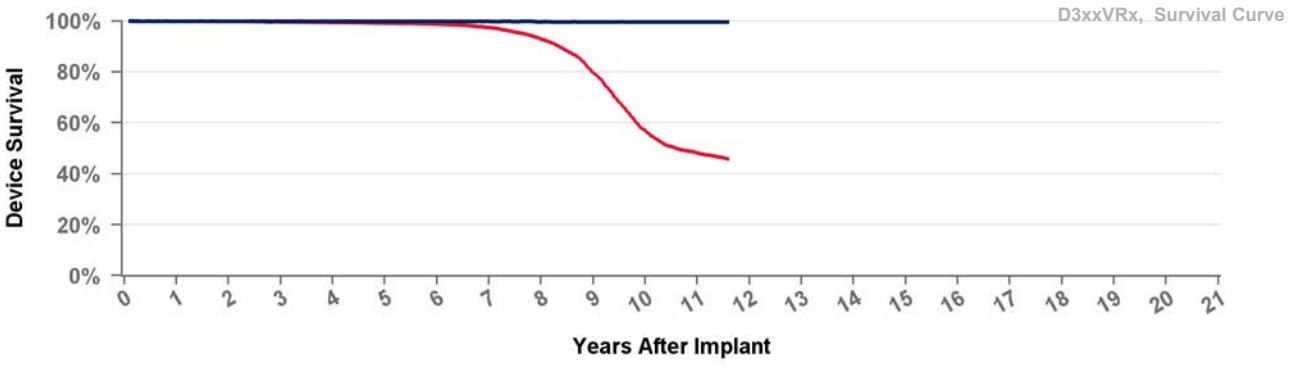
Years	1	2	3	4	5	6	7	8	9	10	11	at 139 mo
Excluding NBD	100.0%	100.0%	100.0%	99.9%	99.9%	99.9%	99.8%	99.8%	99.7%	99.7%	99.7%	99.7%
Including NBD	99.9%	99.9%	99.7%	99.5%	99.2%	98.8%	97.4%	92.9%	79.7%	56.8%	48.1%	45.8%
Effective Sample Size	25804	23984	22243	20574	19021	17447	15688	13081	8453	4069	1831	170

D364VRM Protecta VR

US Market Release
CE Approval Date 17Dec2010
Registered USA Implants
Estimated Active USA Implants
Normal Battery Depletions

Total Malfunctions (USA)
Therapy Function Not Compromised

Therapy Function Compromised



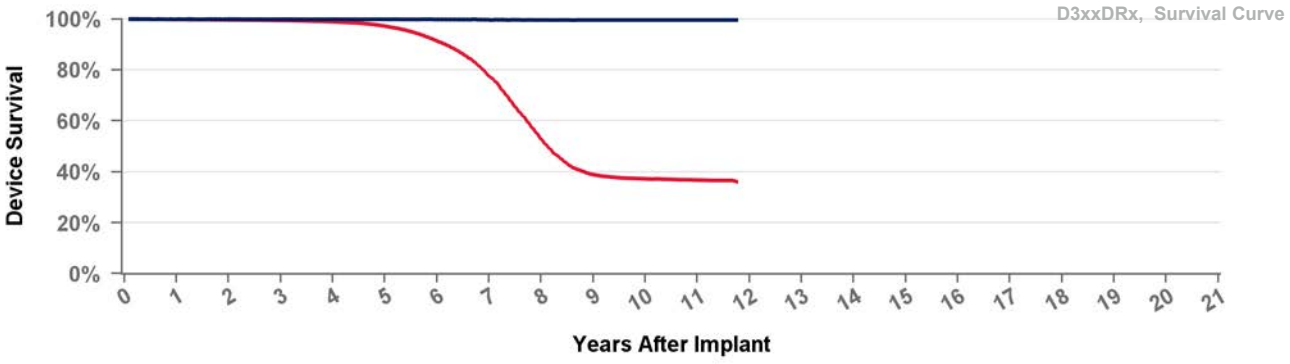
Years	1	2	3	4	5	6	7	8	9	10	11	at 139 mo
Excluding NBD	100.0%	100.0%	100.0%	99.9%	99.9%	99.9%	99.8%	99.8%	99.7%	99.7%	99.7%	99.7%
Including NBD	99.9%	99.9%	99.7%	99.5%	99.2%	98.8%	97.4%	92.9%	79.7%	56.8%	48.1%	45.8%
Effective Sample Size	25804	23984	22243	20574	19021	17447	15688	13081	8453	4069	1831	170

D384DRG Cardia DR

US Market Release
CE Approval Date 12Jan2011
Registered USA Implants
Estimated Active USA Implants
Normal Battery Depletions

Total Malfunctions (USA)
Therapy Function Not Compromised

Therapy Function Compromised

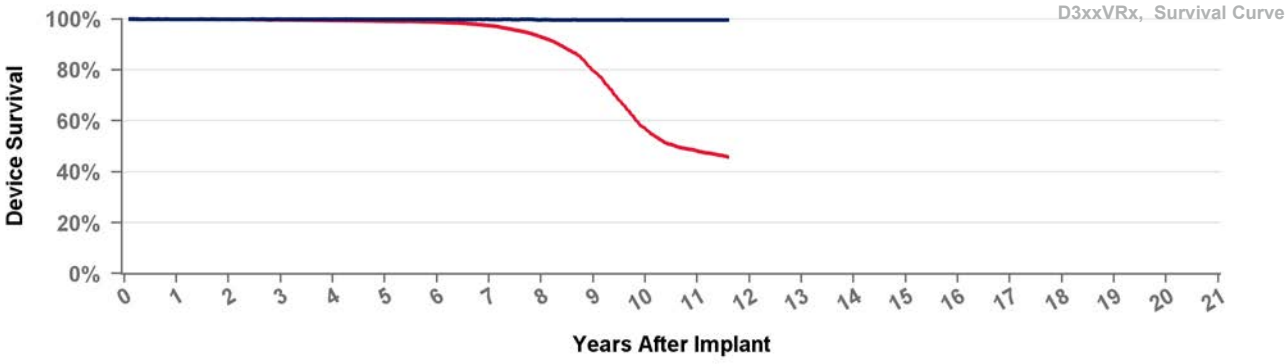


Years	1	2	3	4	5	6	7	8	9	10	11	at 141 mo
Excluding NBD	100.0%	99.9%	99.9%	99.9%	99.9%	99.8%	99.7%	99.7%	99.6%	99.6%	99.6%	99.6%
Including NBD	99.8%	99.7%	99.5%	99.0%	97.2%	91.3%	77.6%	52.9%	38.9%	37.3%	36.8%	36.1%
Effective Sample Size	54186	50303	46255	42263	37894	31014	20482	9364	5256	4478	2782	122

D384VRG Cardia VR

US Market Release
CE Approval Date 12Jan2011
Registered USA Implants
Estimated Active USA Implants
Normal Battery Depletions

Total Malfunctions (USA)
Therapy Function Not Compromised
Therapy Function Compromised

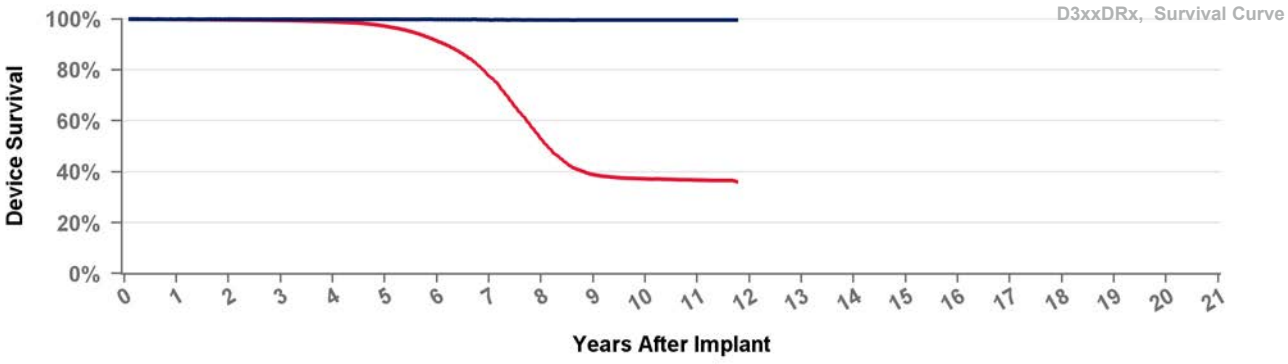


Years	1	2	3	4	5	6	7	8	9	10	11	at 139 mo
Excluding NBD	100.0%	100.0%	100.0%	99.9%	99.9%	99.9%	99.8%	99.8%	99.7%	99.7%	99.7%	99.7%
Including NBD	99.9%	99.9%	99.7%	99.5%	99.2%	98.8%	97.4%	92.9%	79.7%	56.8%	48.1%	45.8%
Effective Sample Size	25804	23984	22243	20574	19021	17447	15688	13081	8453	4069	1831	170

D394DRG Egida DR

US Market Release
CE Approval Date 12Jan2011
Registered USA Implants
Estimated Active USA Implants
Normal Battery Depletions

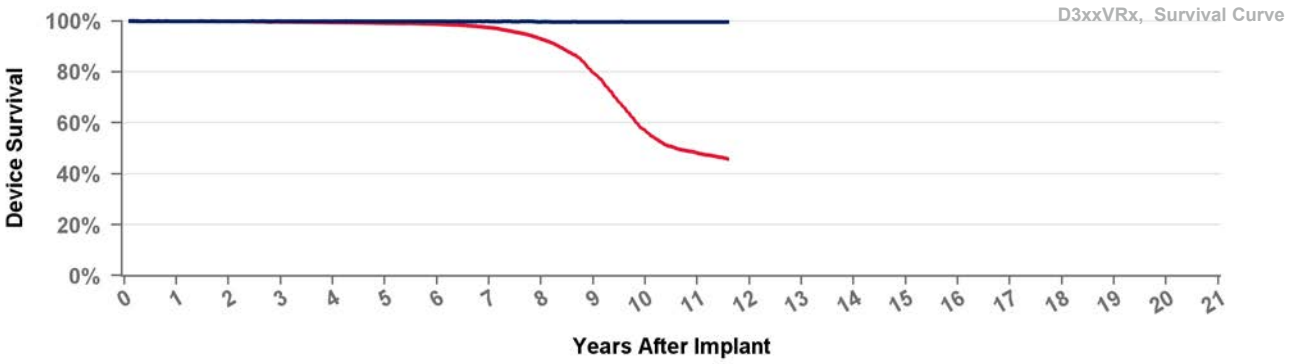
Total Malfunctions (USA)
Therapy Function Not Compromised
Therapy Function Compromised



Years	1	2	3	4	5	6	7	8	9	10	11	at 141 mo
Excluding NBD	100.0%	99.9%	99.9%	99.9%	99.9%	99.8%	99.7%	99.7%	99.6%	99.6%	99.6%	99.6%
Including NBD	99.8%	99.7%	99.5%	99.0%	97.2%	91.3%	77.6%	52.9%	38.9%	37.3%	36.8%	36.1%
Effective Sample Size	54186	50303	46255	42263	37894	31014	20482	9364	5256	4478	2782	122

D394VRG Egida VR

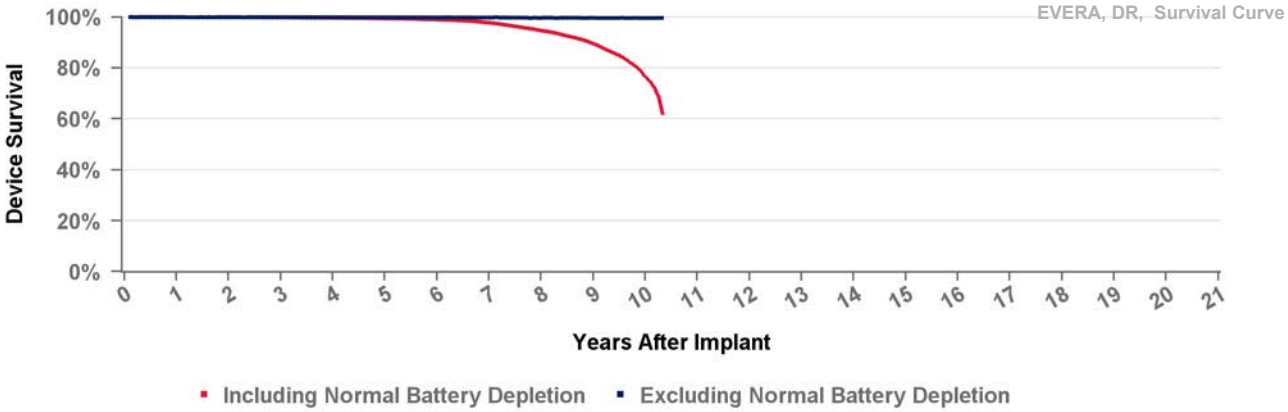
US Market Release		**Total Malfunctions (USA)**	
CE Approval Date	12Jan2011	**Therapy Function Not Compromised**	
Registered USA Implants			
Estimated Active USA Implants		**Therapy Function Compromised**	
Normal Battery Depletions			



Years	1	2	3	4	5	6	7	8	9	10	11	at 139 mo
Excluding NBD	100.0%	100.0%	100.0%	99.9%	99.9%	99.9%	99.8%	99.8%	99.7%	99.7%	99.7%	99.7%
Including NBD	99.9%	99.9%	99.7%	99.5%	99.2%	98.8%	97.4%	92.9%	79.7%	56.8%	48.1%	45.8%
Effective Sample Size	25804	23984	22243	20574	19021	17447	15688	13081	8453	4069	1831	170

DDBB1D1 Evera XT

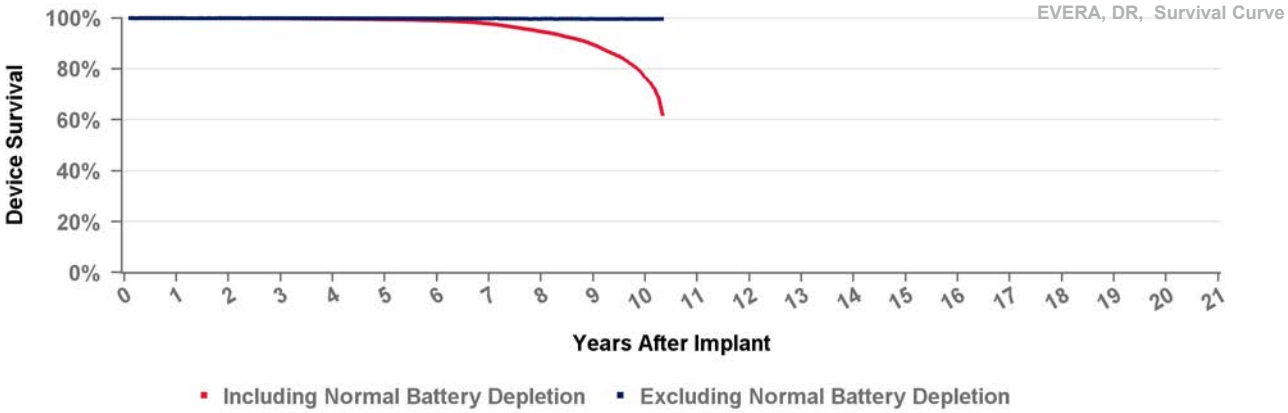
US Market Release	03Apr2013	**Total Malfunctions (USA)**	**82**
CE Approval Date		**Therapy Function Not Compromised**	**47**
Registered USA Implants	82,209	Battery	28
Estimated Active USA Implants	39,936	Device-Related Current Pathway	1
Normal Battery Depletions	2,737	Electrical Component	15
		Software/Firmware	1
		Other	2
		Therapy Function Compromised	**35**
		Battery	30
		Device-Related Current Pathway	1
		Electrical Component	2
		Electrical Interconnect	1
		Other	1



Years	1	2	3	4	5	6	7	8	9	10	at 124 mo
Excluding NBD	100.0%	100.0%	100.0%	99.9%	99.9%	99.8%	99.8%	99.7%	99.7%	99.7%	99.7%
Including NBD	99.9%	99.9%	99.8%	99.7%	99.5%	99.0%	97.7%	94.7%	89.5%	76.7%	62.1%
Effective Sample Size	215979	193111	172133	146486	117228	88287	61023	36887	18488	4254	657

DDBB1D4 Evera XT

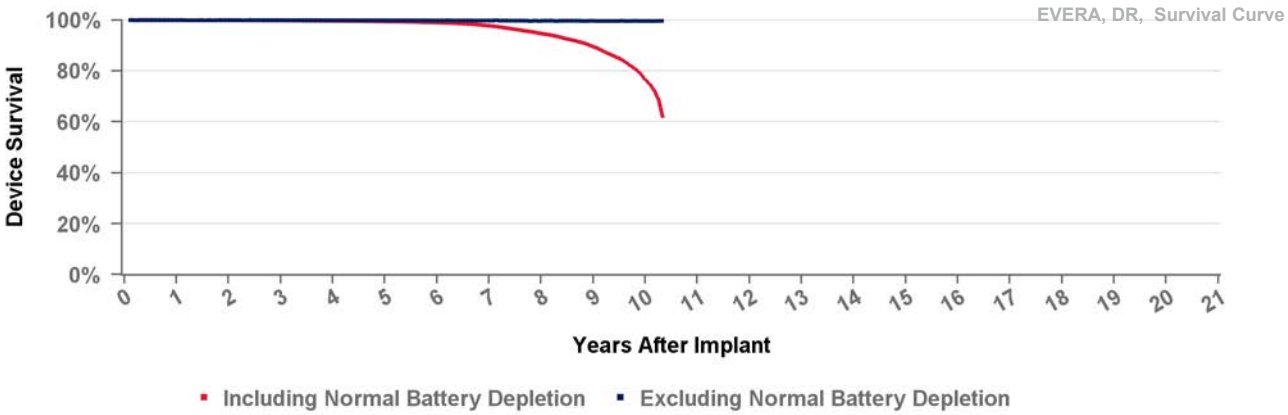
US Market Release	03Apr2013	**Total Malfunctions (USA)**	**72**
CE Approval Date		**Therapy Function Not Compromised**	**42**
Registered USA Implants	59,387	Battery	31
Estimated Active USA Implants	28,644	Electrical Component	7
Normal Battery Depletions	2,160	Electrical Interconnect	2
		Possible Early Battery Depletion	1
		Other	1
		Therapy Function Compromised	**30**
		Battery	22
		Device-Related Current Pathway	4
		Electrical Component	4



Years	1	2	3	4	5	6	7	8	9	10	at 124 mo
Excluding NBD	100.0%	100.0%	100.0%	99.9%	99.9%	99.8%	99.8%	99.7%	99.7%	99.7%	99.7%
Including NBD	99.9%	99.9%	99.8%	99.7%	99.5%	99.0%	97.7%	94.7%	89.5%	76.7%	62.1%
Effective Sample Size	215979	193111	172133	146486	117228	88287	61023	36887	18488	4254	657

DDBB2D1 Evera XT

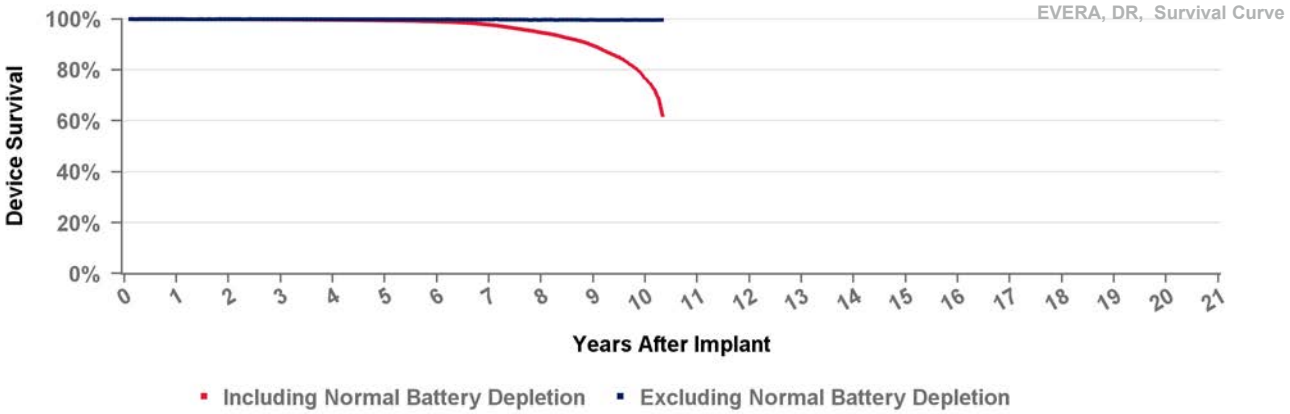
US Market Release		**Total Malfunctions (USA)**	
CE Approval Date	17Dec2012	**Therapy Function Not Compromised**	
Registered USA Implants	2		
Estimated Active USA Implants		**Therapy Function Compromised**	
Normal Battery Depletions			



Years	1	2	3	4	5	6	7	8	9	10	at 124 mo
Excluding NBD	100.0%	100.0%	100.0%	99.9%	99.9%	99.8%	99.8%	99.7%	99.7%	99.7%	99.7%
Including NBD	99.9%	99.9%	99.8%	99.7%	99.5%	99.0%	97.7%	94.7%	89.5%	76.7%	62.1%
Effective Sample Size	215979	193111	172133	146486	117228	88287	61023	36887	18488	4254	657

DDBB2D4 Evera XT

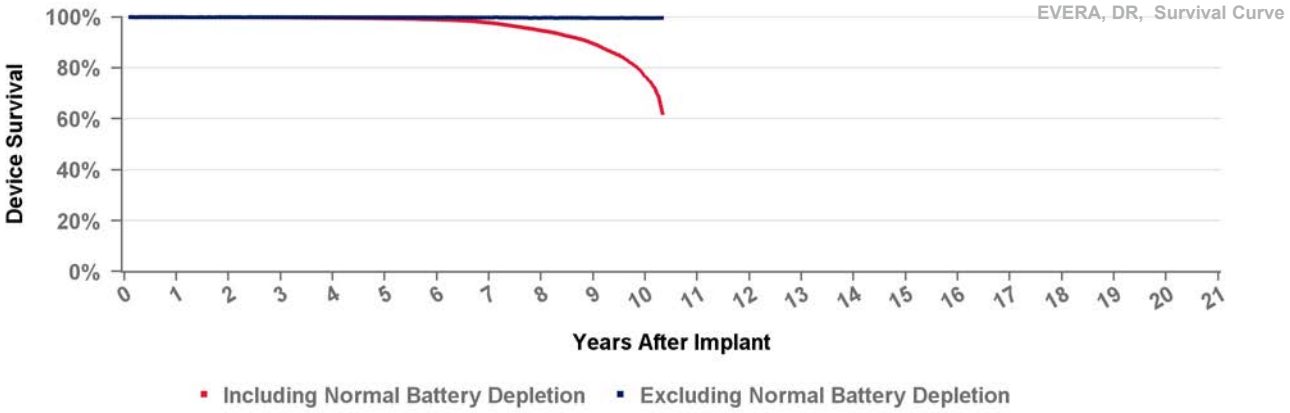
US Market Release		**Total Malfunctions (USA)**	
CE Approval Date	17Dec2012	**Therapy Function Not Compromised**	
Registered USA Implants			
Estimated Active USA Implants		**Therapy Function Compromised**	
Normal Battery Depletions			



Years	1	2	3	4	5	6	7	8	9	10	at 124 mo
Excluding NBD	100.0%	100.0%	100.0%	99.9%	99.9%	99.8%	99.8%	99.7%	99.7%	99.7%	99.7%
Including NBD	99.9%	99.9%	99.8%	99.7%	99.5%	99.0%	97.7%	94.7%	89.5%	76.7%	62.1%
Effective Sample Size	215979	193111	172133	146486	117228	88287	61023	36887	18488	4254	657

DDBC3D1 Evera S

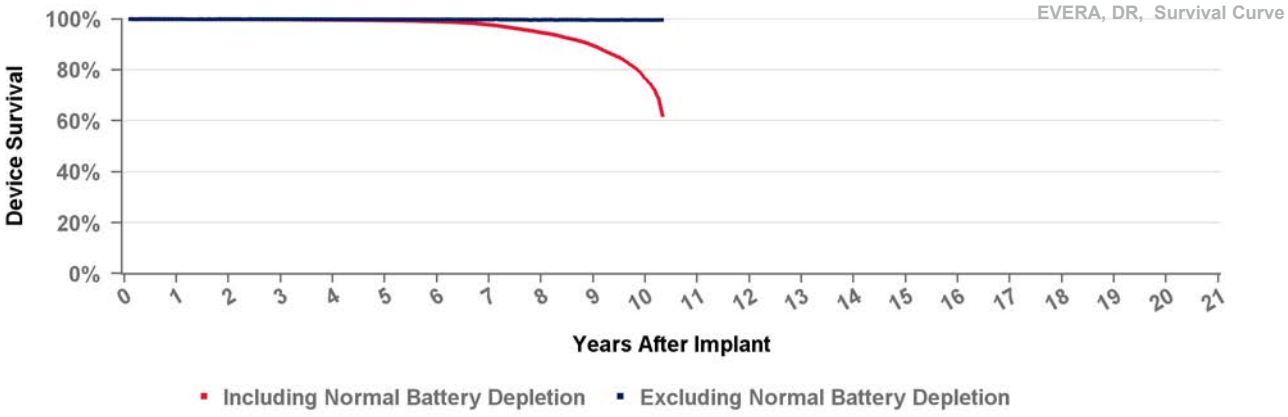
US Market Release	03Apr2013	**Total Malfunctions (USA)**	**18**
CE Approval Date	17Dec2012	**Therapy Function Not Compromised**	**9**
Registered USA Implants	15,928	Battery	7
Estimated Active USA Implants	7,513	Electrical Component	2
Normal Battery Depletions	645	**Therapy Function Compromised**	**9**
		Battery	6
		Device-Related Current Pathway	1
		Electrical Component	2



Years	1	2	3	4	5	6	7	8	9	10	at 124 mo
Excluding NBD	100.0%	100.0%	100.0%	99.9%	99.9%	99.8%	99.8%	99.7%	99.7%	99.7%	99.7%
Including NBD	99.9%	99.9%	99.8%	99.7%	99.5%	99.0%	97.7%	94.7%	89.5%	76.7%	62.1%
Effective Sample Size	215979	193111	172133	146486	117228	88287	61023	36887	18488	4254	657

DDBC3D4 Evera S

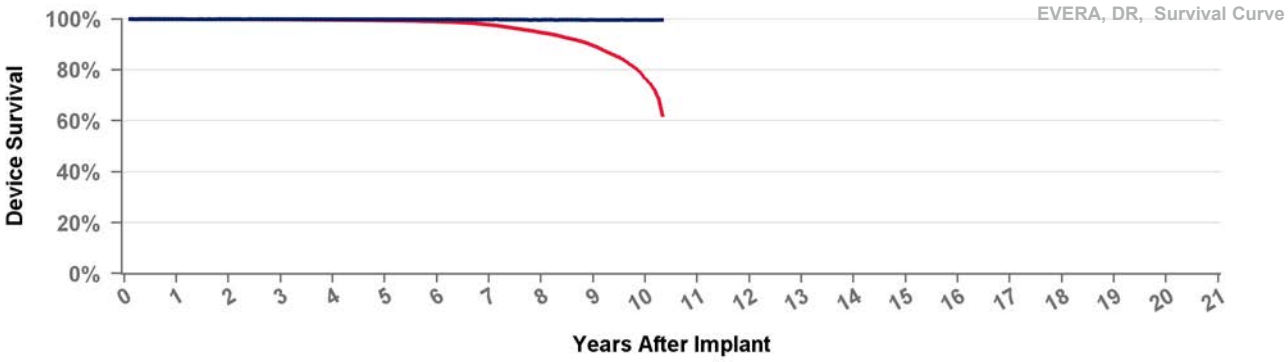
US Market Release	03Apr2013	**Total Malfunctions (USA)**	**13**
CE Approval Date	17Dec2013	**Therapy Function Not Compromised**	**5**
Registered USA Implants	11,810	Battery	3
Estimated Active USA Implants	5,701	Electrical Component	2
Normal Battery Depletions	498	**Therapy Function Compromised**	**8**
		Battery	5
		Device-Related Current Pathway	1
		Electrical Component	1
		Possible Early Battery Depletion	1



Years	1	2	3	4	5	6	7	8	9	10	at 124 mo
Excluding NBD	100.0%	100.0%	100.0%	99.9%	99.9%	99.8%	99.8%	99.7%	99.7%	99.7%	99.7%
Including NBD	99.9%	99.9%	99.8%	99.7%	99.5%	99.0%	97.7%	94.7%	89.5%	76.7%	62.1%
Effective Sample Size	215979	193111	172133	146486	117228	88287	61023	36887	18488	4254	657

DDMB1D1 Evera MRI XT

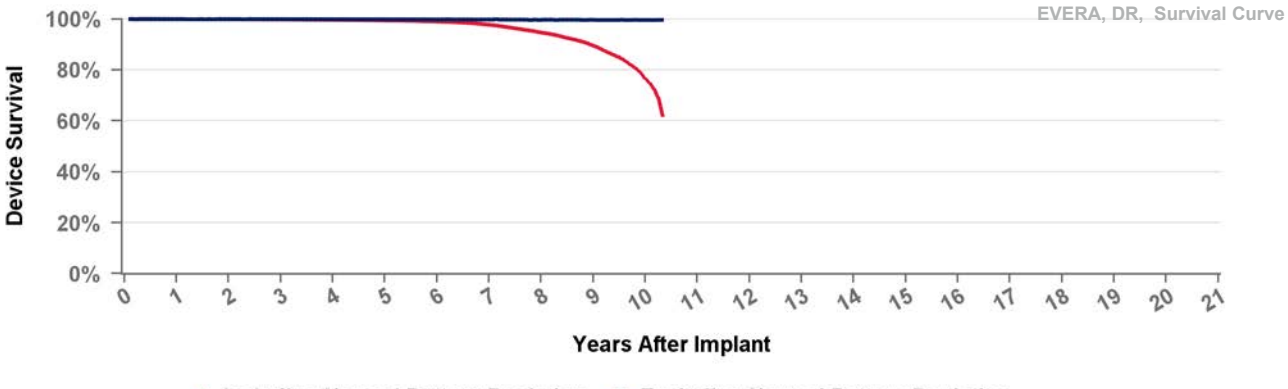
US Market Release	12Oct2016	**Total Malfunctions (USA)**	**39**
CE Approval Date		**Therapy Function Not Compromised**	**22**
Registered USA Implants	46,099	Battery	12
Estimated Active USA Implants	35,552	Electrical Component	8
Normal Battery Depletions	120	Electrical Interconnect	1
		Other	1
		Therapy Function Compromised	**17**
		Battery	6
		Device-Related Current Pathway	5
		Electrical Component	6



Years	1	2	3	4	5	6	7	8	9	10	at 124 mo
Excluding NBD	100.0%	100.0%	100.0%	99.9%	99.9%	99.8%	99.8%	99.7%	99.7%	99.7%	99.7%
Including NBD	99.9%	99.9%	99.8%	99.7%	99.5%	99.0%	97.7%	94.7%	89.5%	76.7%	62.1%
Effective Sample Size	215979	193111	172133	146486	117228	88287	61023	36887	18488	4254	657

DDMB1D4 Evera MRI XT

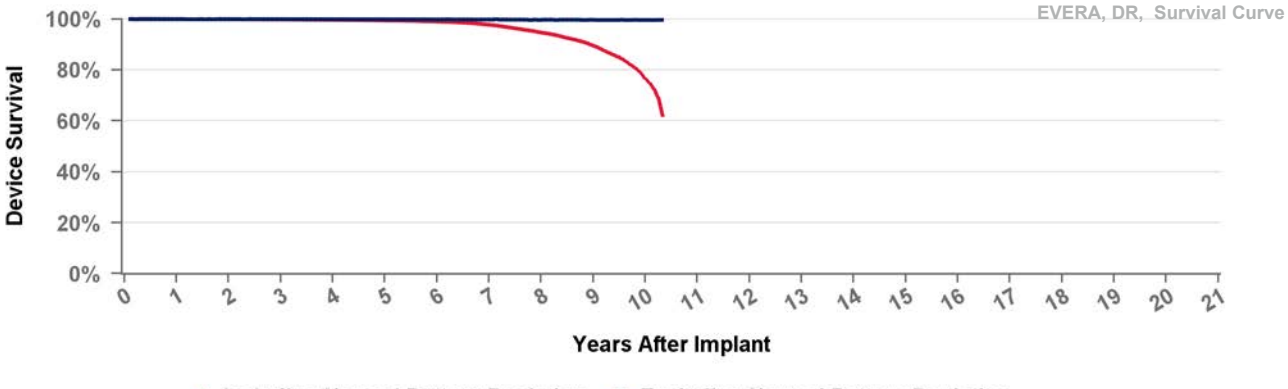
US Market Release	11Sep2015	**Total Malfunctions (USA)**	**92**
CE Approval Date		**Therapy Function Not Compromised**	**54**
Registered USA Implants	138,471	Battery	25
Estimated Active USA Implants	107,936	Electrical Component	23
Normal Battery Depletions	523	Electrical Interconnect	4
		Other	2
		Therapy Function Compromised	**38**
		Battery	24
		Device-Related Current Pathway	10
		Electrical Component	4



Years	1	2	3	4	5	6	7	8	9	10	at 124 mo
Excluding NBD	100.0%	100.0%	100.0%	99.9%	99.9%	99.8%	99.8%	99.7%	99.7%	99.7%	99.7%
Including NBD	99.9%	99.9%	99.8%	99.7%	99.5%	99.0%	97.7%	94.7%	89.5%	76.7%	62.1%
Effective Sample Size	215979	193111	172133	146486	117228	88287	61023	36887	18488	4254	657

DDMB2D1 Evera MRI XT

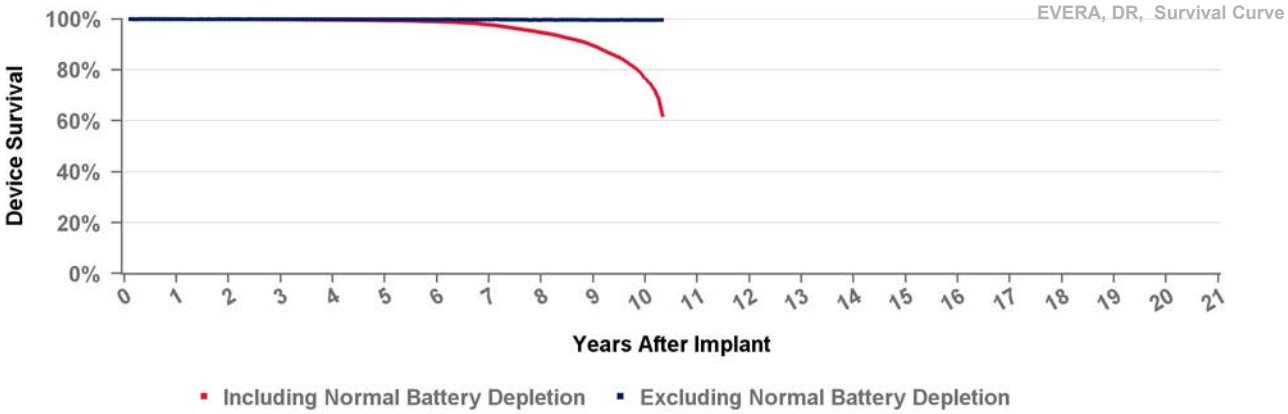
US Market Release		**Total Malfunctions (USA)**	
CE Approval Date	05Sep2016	**Therapy Function Not Compromised**	
Registered USA Implants	1		
Estimated Active USA Implants	1	**Therapy Function Compromised**	
Normal Battery Depletions			



Years	1	2	3	4	5	6	7	8	9	10	at 124 mo
Excluding NBD	100.0%	100.0%	100.0%	99.9%	99.9%	99.8%	99.8%	99.7%	99.7%	99.7%	99.7%
Including NBD	99.9%	99.9%	99.8%	99.7%	99.5%	99.0%	97.7%	94.7%	89.5%	76.7%	62.1%
Effective Sample Size	215979	193111	172133	146486	117228	88287	61023	36887	18488	4254	657

DDMB2D4 Evera MRI XT

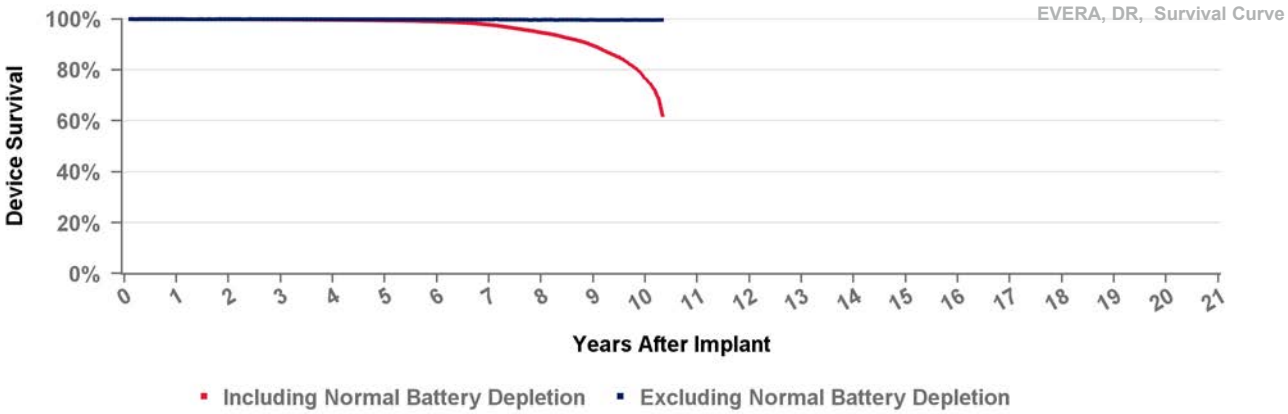
US Market Release		**Total Malfunctions (USA)**	
CE Approval Date	31Mar2014	**Therapy Function Not Compromised**	
Registered USA Implants			
Estimated Active USA Implants		**Therapy Function Compromised**	
Normal Battery Depletions			



Years	1	2	3	4	5	6	7	8	9	10	at 124 mo
Excluding NBD	100.0%	100.0%	100.0%	99.9%	99.9%	99.8%	99.8%	99.7%	99.7%	99.7%	99.7%
Including NBD	99.9%	99.9%	99.8%	99.7%	99.5%	99.0%	97.7%	94.7%	89.5%	76.7%	62.1%
Effective Sample Size	215979	193111	172133	146486	117228	88287	61023	36887	18488	4254	657

DDMC3D1 Evera MRI S

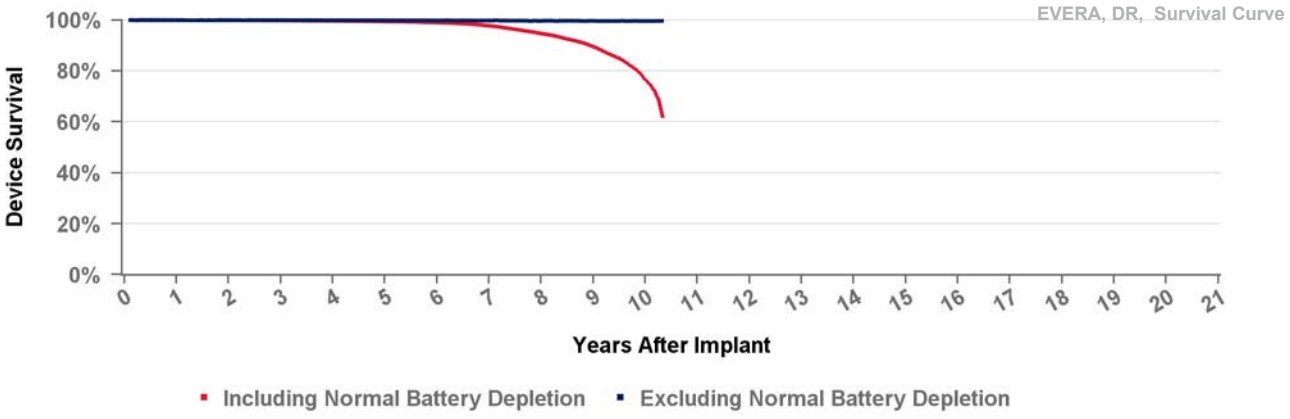
US Market Release	12Oct2016	**Total Malfunctions (USA)**	**3**
CE Approval Date	05Sep2016	**Therapy Function Not Compromised**	**2**
Registered USA Implants	4,083	Battery	1
Estimated Active USA Implants	3,124	Electrical Component	1
Normal Battery Depletions	16	**Therapy Function Compromised**	**1**
		Device-Related Current Pathway	1



Years	1	2	3	4	5	6	7	8	9	10	at 124 mo
Excluding NBD	100.0%	100.0%	100.0%	99.9%	99.9%	99.8%	99.8%	99.7%	99.7%	99.7%	99.7%
Including NBD	99.9%	99.9%	99.8%	99.7%	99.5%	99.0%	97.7%	94.7%	89.5%	76.7%	62.1%
Effective Sample Size	215979	193111	172133	146486	117228	88287	61023	36887	18488	4254	657

DDMC3D4 Evera MRI

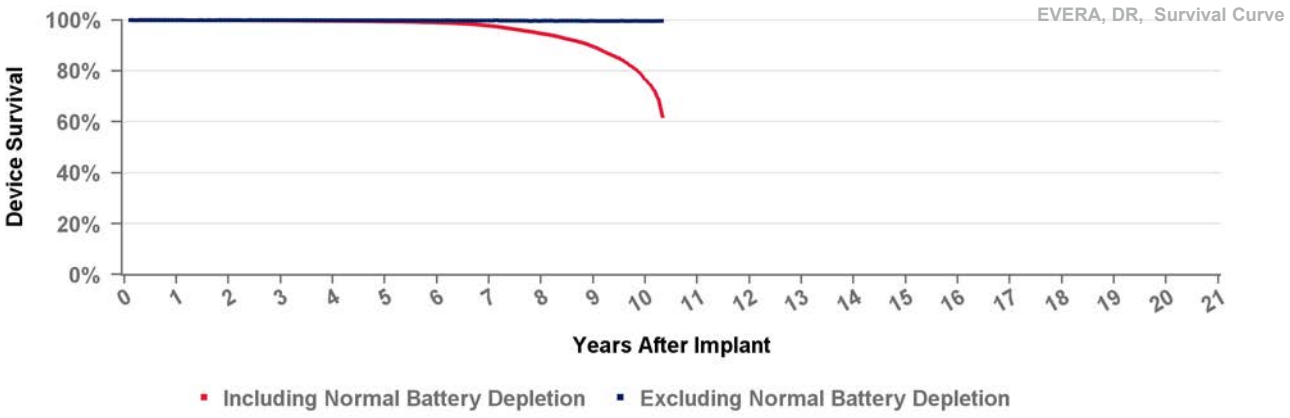
US Market Release	11Sep2015	**Total Malfunctions (USA)**	**9**
CE Approval Date	31Mar2014	**Therapy Function Not Compromised**	**5**
Registered USA Implants	9,242	Battery	4
Estimated Active USA Implants	7,107	Electrical Component	1
Normal Battery Depletions	30	**Therapy Function Compromised**	**4**
		Battery	1
		Device-Related Current Pathway	2
		Electrical Component	1



Years	1	2	3	4	5	6	7	8	9	10	at 124 mo
Excluding NBD	100.0%	100.0%	100.0%	99.9%	99.9%	99.8%	99.8%	99.7%	99.7%	99.7%	99.7%
Including NBD	99.9%	99.9%	99.8%	99.7%	99.5%	99.0%	97.7%	94.7%	89.5%	76.7%	62.1%
Effective Sample Size	215979	193111	172133	146486	117228	88287	61023	36887	18488	4254	657

DDMD3D1 Primo

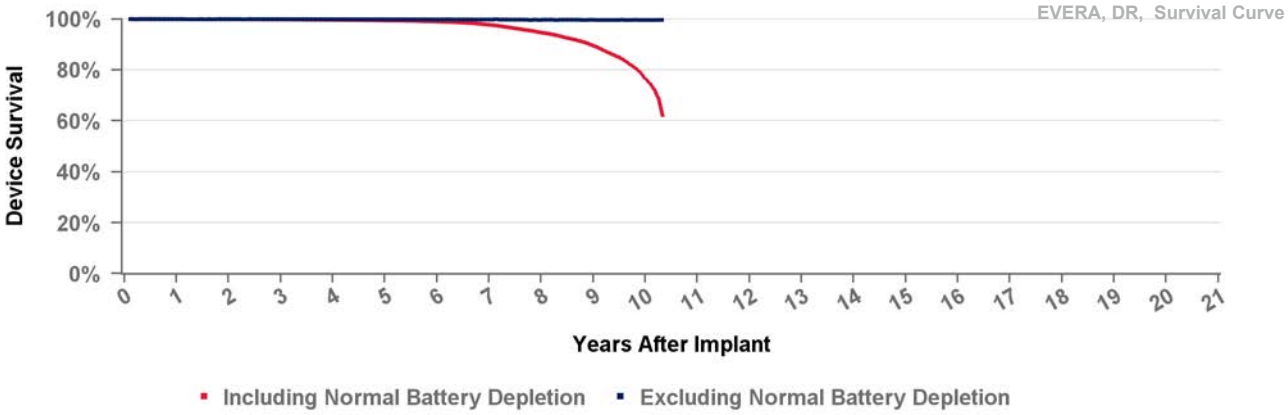
US Market Release	01Mar2018	**Total Malfunctions (USA)**	**1**
CE Approval Date	10Nov2017	**Therapy Function Not Compromised**	**1**
Registered USA Implants	442	Electrical Component	1
Estimated Active USA Implants	391	**Therapy Function Compromised**	**0**
Normal Battery Depletions			



Years	1	2	3	4	5	6	7	8	9	10	at 124 mo
Excluding NBD	100.0%	100.0%	100.0%	99.9%	99.9%	99.8%	99.8%	99.7%	99.7%	99.7%	99.7%
Including NBD	99.9%	99.9%	99.8%	99.7%	99.5%	99.0%	97.7%	94.7%	89.5%	76.7%	62.1%
Effective Sample Size	215979	193111	172133	146486	117228	88287	61023	36887	18488	4254	657

DDMD3D4 Primo

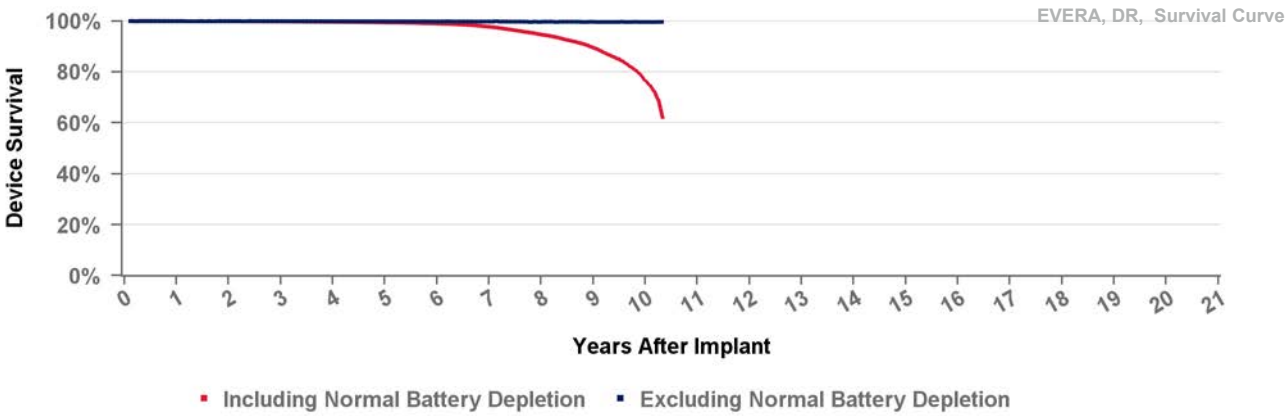
US Market Release	01Mar2018	**Total Malfunctions (USA)**	
CE Approval Date	10Nov2017	**Therapy Function Not Compromised**	
Registered USA Implants	1,437		
Estimated Active USA Implants	1,318	**Therapy Function Compromised**	
Normal Battery Depletions	1		



Years	1	2	3	4	5	6	7	8	9	10	at 124 mo
Excluding NBD	100.0%	100.0%	100.0%	99.9%	99.9%	99.8%	99.8%	99.7%	99.7%	99.7%	99.7%
Including NBD	99.9%	99.9%	99.8%	99.7%	99.5%	99.0%	97.7%	94.7%	89.5%	76.7%	62.1%
Effective Sample Size	215979	193111	172133	146486	117228	88287	61023	36887	18488	4254	657

DDME3D1 Mirro

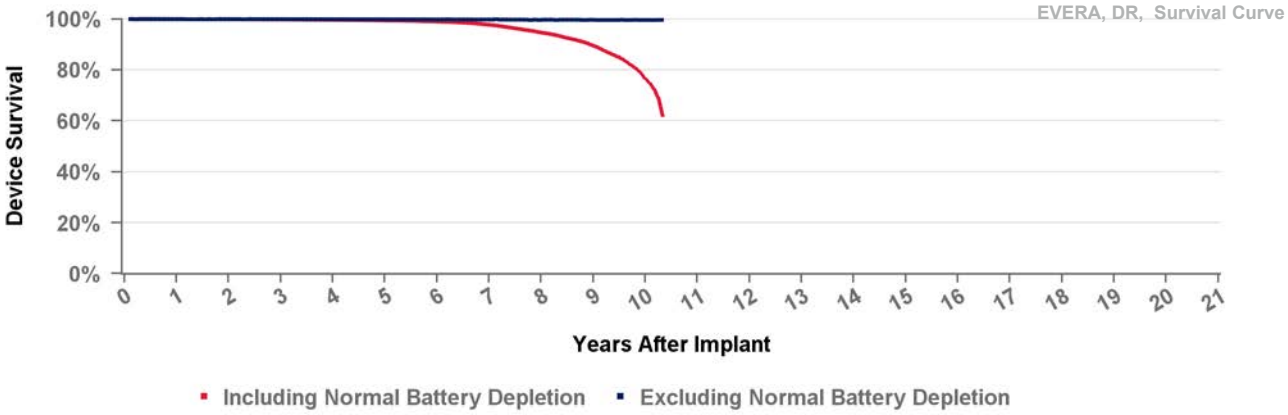
US Market Release	01Mar2018	**Total Malfunctions (USA)**	
CE Approval Date	10Nov2017	**Therapy Function Not Compromised**	
Registered USA Implants			
Estimated Active USA Implants		**Therapy Function Compromised**	
Normal Battery Depletions			



Years	1	2	3	4	5	6	7	8	9	10	at 124 mo
Excluding NBD	100.0%	100.0%	100.0%	99.9%	99.9%	99.8%	99.8%	99.7%	99.7%	99.7%	99.7%
Including NBD	99.9%	99.9%	99.8%	99.7%	99.5%	99.0%	97.7%	94.7%	89.5%	76.7%	62.1%
Effective Sample Size	215979	193111	172133	146486	117228	88287	61023	36887	18488	4254	657

DDME3D4 Mirro

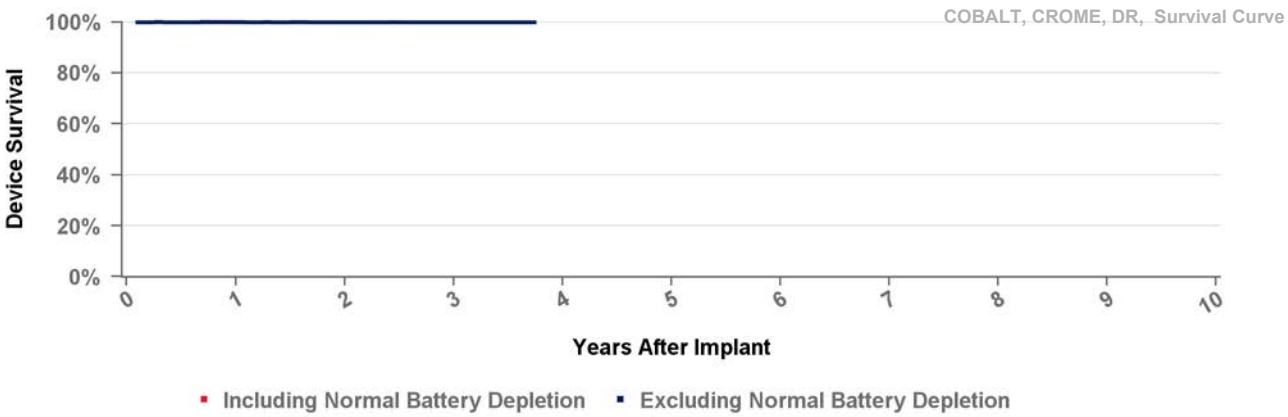
US Market Release	01Mar2018	**Total Malfunctions (USA)**	
CE Approval Date	10Nov2017	**Therapy Function Not Compromised**	
Registered USA Implants			
Estimated Active USA Implants		**Therapy Function Compromised**	
Normal Battery Depletions			



Years	1	2	3	4	5	6	7	8	9	10	at 124 mo
Excluding NBD	100.0%	100.0%	100.0%	99.9%	99.9%	99.8%	99.8%	99.7%	99.7%	99.7%	99.7%
Including NBD	99.9%	99.9%	99.8%	99.7%	99.5%	99.0%	97.7%	94.7%	89.5%	76.7%	62.1%
Effective Sample Size	215979	193111	172133	146486	117228	88287	61023	36887	18488	4254	657

DDPA2D1 Cobalt XT

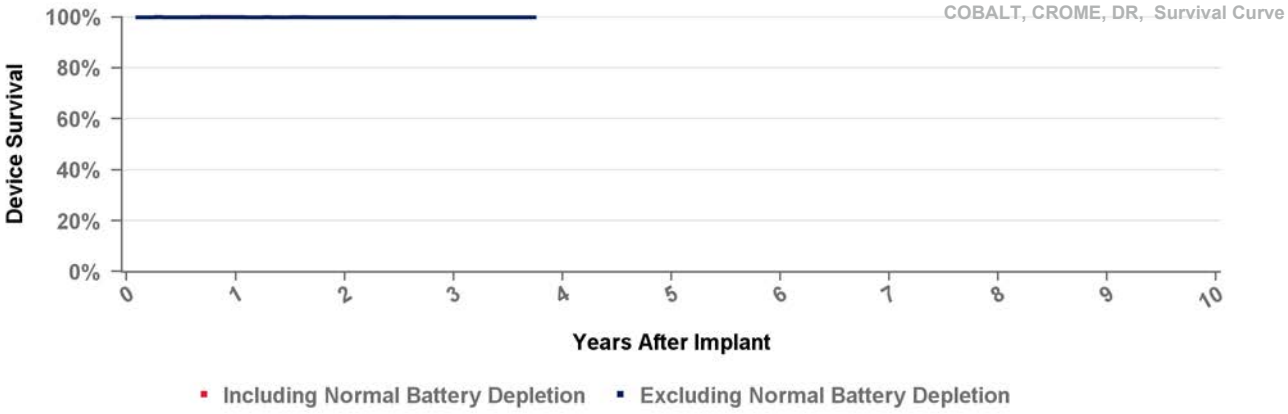
US Market Release	23Apr2020	**Total Malfunctions (USA)**		**1**
CE Approval Date	18Dec2019	**Therapy Function Not Compromised**		**1**
Registered USA Implants	5,741		Electrical Component	1
Estimated Active USA Implants	5,495	**Therapy Function Compromised**		**0**
Normal Battery Depletions				



Years	1	2	3	at 45 mo
Excluding NBD	100.0%	100.0%	100.0%	100.0%
Including NBD	100.0%	99.9%	99.9%	99.9%
Effective Sample Size	24487	13947	4335	178

DDPA2D4 Cobalt XT

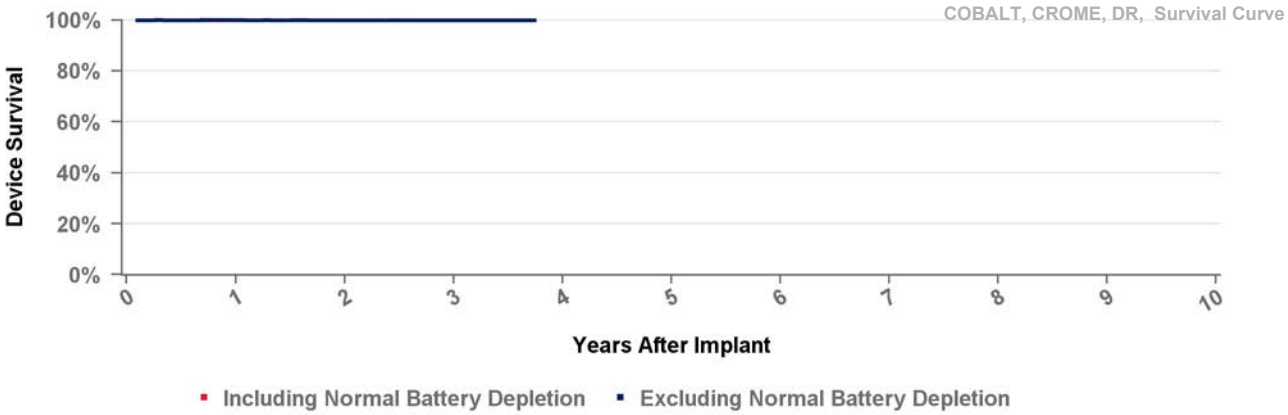
US Market Release	23Apr2020	**Total Malfunctions (USA)**	**1**
CE Approval Date	18Dec2019	**Therapy Function Not Compromised**	**1**
Registered USA Implants	45,175	Electrical Component	1
Estimated Active USA Implants	43,330	**Therapy Function Compromised**	**0**
Normal Battery Depletions	4		



Years	1	2	3	at 45 mo
Excluding NBD	100.0%	100.0%	100.0%	100.0%
Including NBD	100.0%	99.9%	99.9%	99.9%
Effective Sample Size	24487	13947	4335	178

DDPB3D1 Cobalt

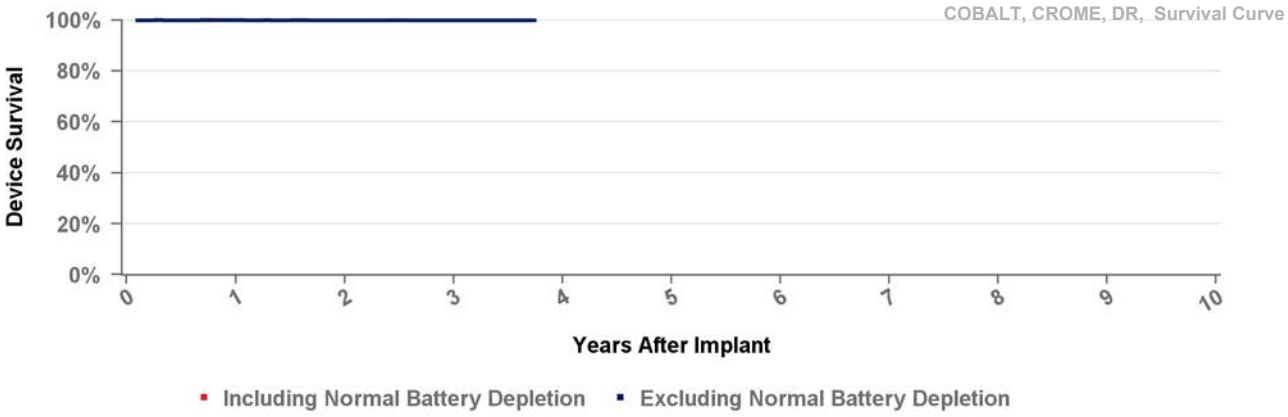
US Market Release	23Apr2020	**Total Malfunctions (USA)**	**2**
CE Approval Date	18Dec2019	**Therapy Function Not Compromised**	**1**
Registered USA Implants	4,182	Battery	1
Estimated Active USA Implants	3,900	**Therapy Function Compromised**	**1**
Normal Battery Depletions		Device-Related Current Pathway	1



Years	1	2	3	at 45 mo
Excluding NBD	100.0%	100.0%	100.0%	100.0%
Including NBD	100.0%	99.9%	99.9%	99.9%
Effective Sample Size	24487	13947	4335	178

DDPB3D4 Cobalt

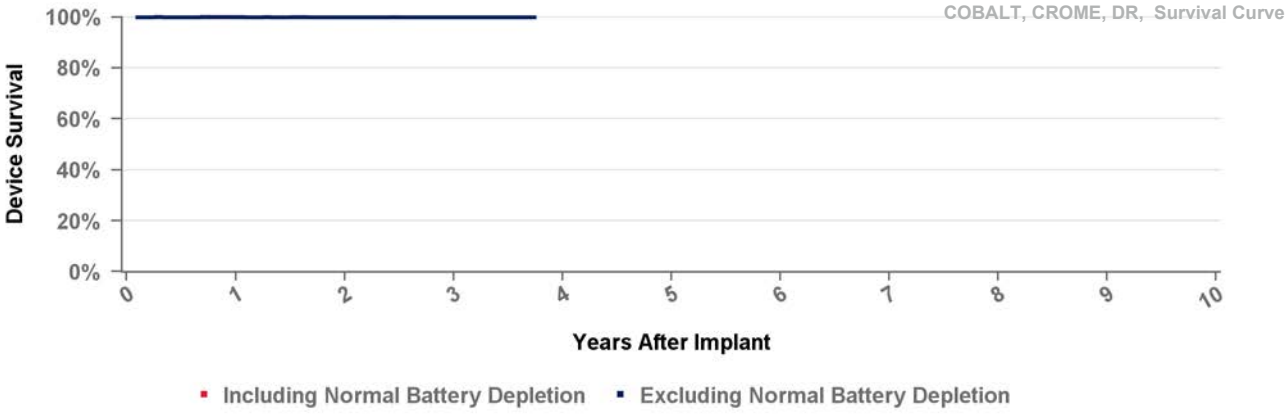
US Market Release	23Apr2020	**Total Malfunctions (USA)**	**7**
CE Approval Date	18Dec2019	**Therapy Function Not Compromised**	**4**
Registered USA Implants	24,252	Battery	1
Estimated Active USA Implants	22,627	Electrical Component	1
Normal Battery Depletions	2	Other	2
		Therapy Function Compromised	**3**
		Electrical Component	1
		Electrical Interconnect	2



Years	1	2	3	at 45 mo
Excluding NBD	100.0%	100.0%	100.0%	100.0%
Including NBD	100.0%	99.9%	99.9%	99.9%
Effective Sample Size	24487	13947	4335	178

DDPC3D1 Crome

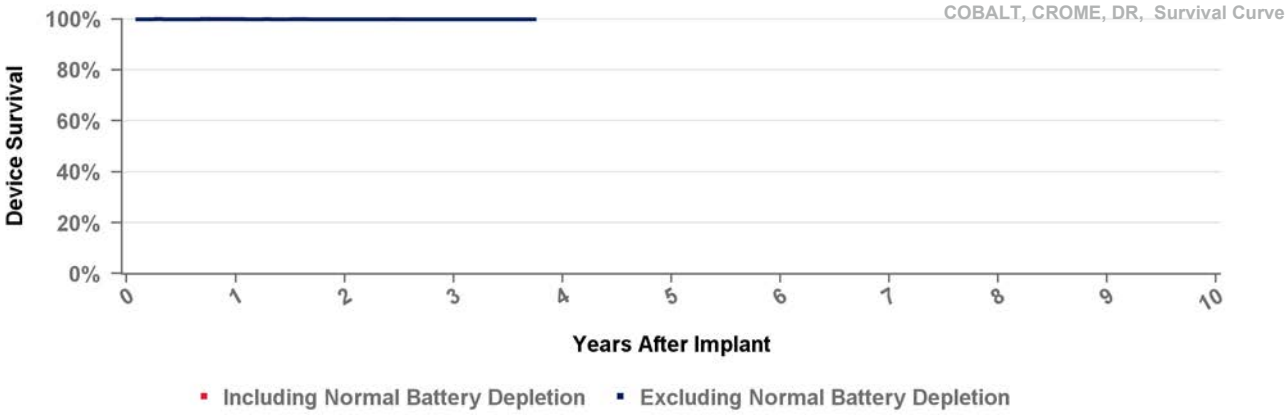
US Market Release	23Apr2020	**Total Malfunctions (USA)**	
CE Approval Date	18Dec2019	**Therapy Function Not Compromised**	
Registered USA Implants	319		
Estimated Active USA Implants	285	**Therapy Function Compromised**	
Normal Battery Depletions			



Years	1	2	3	at 45 mo
Excluding NBD	100.0%	100.0%	100.0%	100.0%
Including NBD	100.0%	99.9%	99.9%	99.9%
Effective Sample Size	24487	13947	4335	178

DDPC3D4 Crome

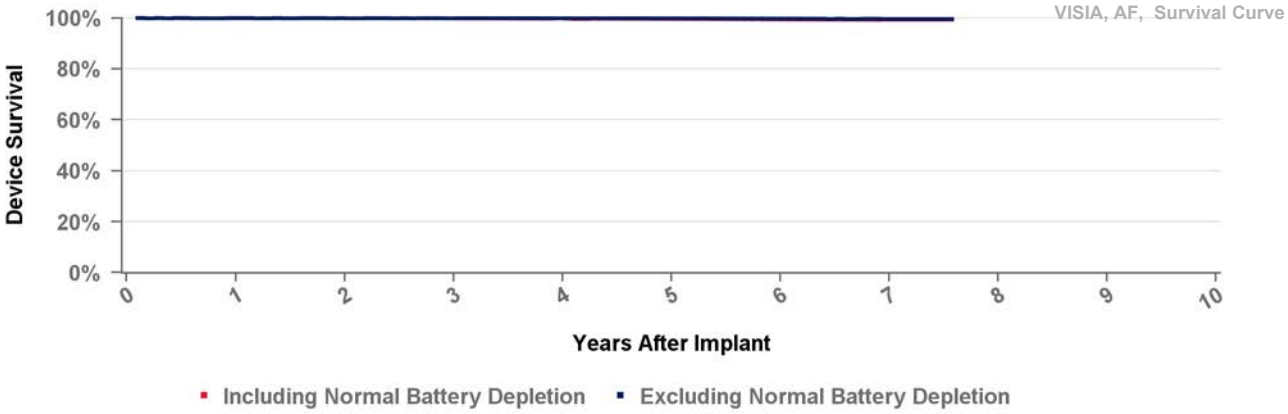
US Market Release	23Apr2020	**Total Malfunctions (USA)**	
CE Approval Date	18Dec2019	**Therapy Function Not Compromised**	
Registered USA Implants	1,882		
Estimated Active USA Implants	1,770	**Therapy Function Compromised**	
Normal Battery Depletions			



Years	1	2	3	at 45 mo
Excluding NBD	100.0%	100.0%	100.0%	100.0%
Including NBD	100.0%	99.9%	99.9%	99.9%
Effective Sample Size	24487	13947	4335	178

DVAB1D1 Visia AF

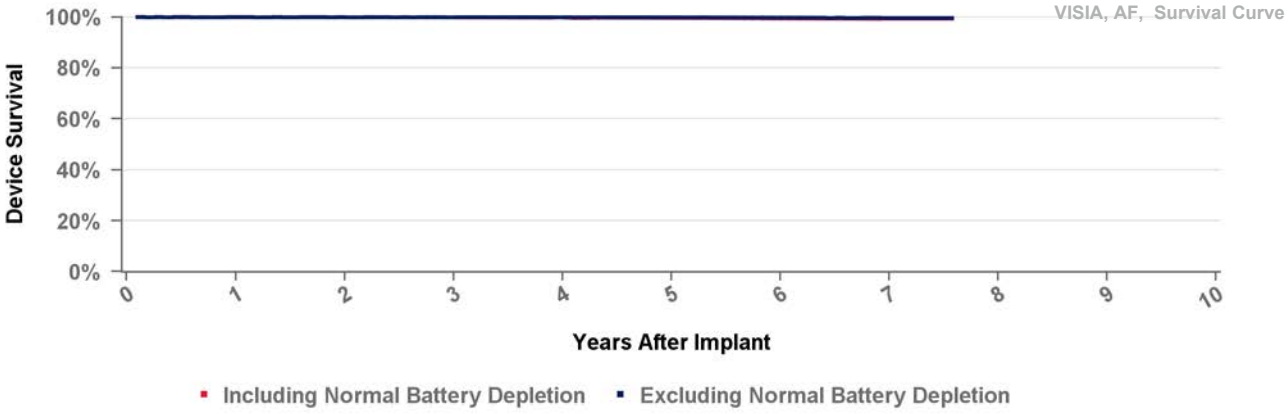
US Market Release	19Jan2016	**Total Malfunctions (USA)**	**7**
CE Approval Date		**Therapy Function Not Compromised**	**5**
Registered USA Implants	5,079	Battery	5
Estimated Active USA Implants	3,402	**Therapy Function Compromised**	**2**
Normal Battery Depletions	13	Battery	2



Years	1	2	3	4	5	6	7	at 91 mo
Excluding NBD	100.0%	100.0%	100.0%	99.9%	99.9%	99.8%	99.7%	99.7%
Including NBD	100.0%	99.9%	99.9%	99.8%	99.7%	99.4%	99.3%	99.3%
Effective Sample Size	75541	65615	55858	44490	31426	18553	6309	457

DVAB1D4 Visia AF

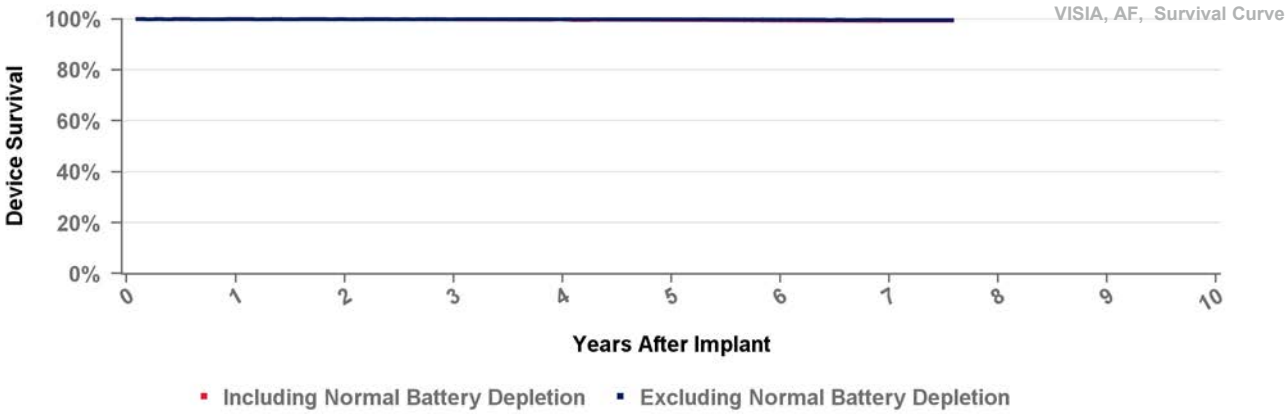
US Market Release	19Jan2016	**Total Malfunctions (USA)**	**5**
CE Approval Date		**Therapy Function Not Compromised**	**2**
Registered USA Implants	3,462	Battery	2
Estimated Active USA Implants	2,427	**Therapy Function Compromised**	**3**
Normal Battery Depletions		Battery	2
		Device-Related Current Pathway	1



Years	1	2	3	4	5	6	7	at 91 mo
Excluding NBD	100.0%	100.0%	100.0%	99.9%	99.9%	99.8%	99.7%	99.7%
Including NBD	100.0%	99.9%	99.9%	99.8%	99.7%	99.4%	99.3%	99.3%
Effective Sample Size	75541	65615	55858	44490	31426	18553	6309	457

DVAB2D1 Visia AF XT

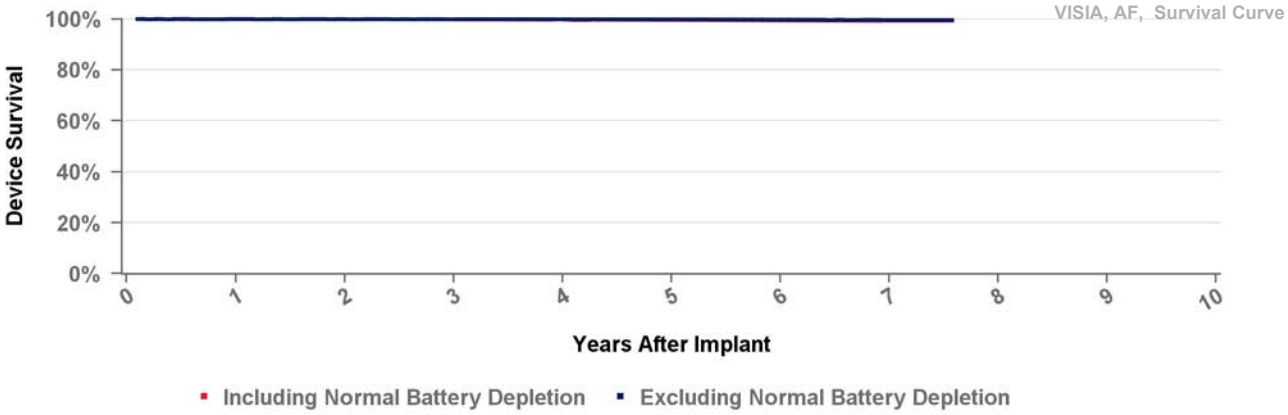
US Market Release		**Total Malfunctions (USA)**	
CE Approval Date	19Oct2015	**Therapy Function Not Compromised**	
Registered USA Implants			
Estimated Active USA Implants		**Therapy Function Compromised**	
Normal Battery Depletions			



Years	1	2	3	4	5	6	7	at 91 mo
Excluding NBD	100.0%	100.0%	100.0%	99.9%	99.9%	99.8%	99.7%	99.7%
Including NBD	100.0%	99.9%	99.9%	99.8%	99.7%	99.4%	99.3%	99.3%
Effective Sample Size	75541	65615	55858	44490	31426	18553	6309	457

DVAC3D1 Visia AF S

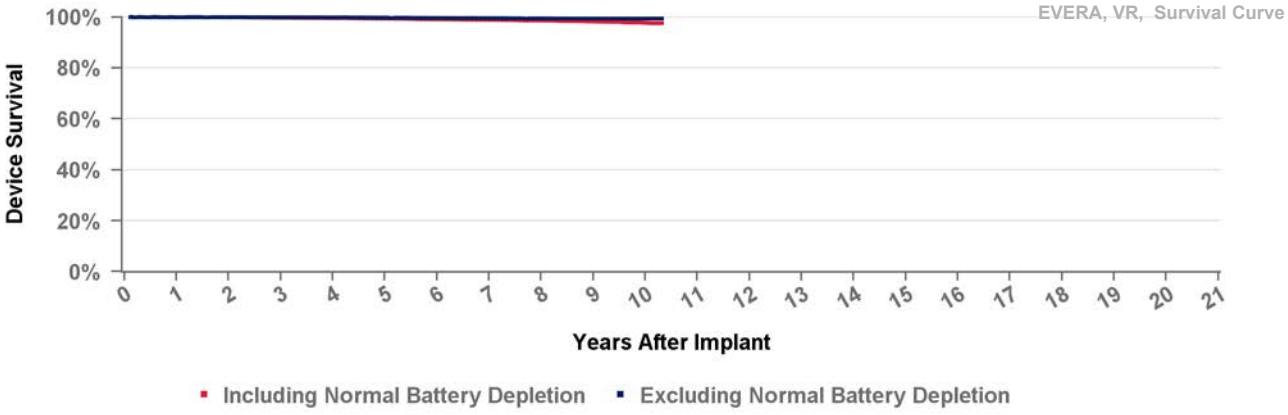
US Market Release	19Jan2016	**Total Malfunctions (USA)**	
CE Approval Date	19Oct2015	**Therapy Function Not Compromised**	
Registered USA Implants			
Estimated Active USA Implants		**Therapy Function Compromised**	
Normal Battery Depletions			



Years	1	2	3	4	5	6	7	at 91 mo
Excluding NBD	100.0%	100.0%	100.0%	99.9%	99.9%	99.8%	99.7%	99.7%
Including NBD	100.0%	99.9%	99.9%	99.8%	99.7%	99.4%	99.3%	99.3%
Effective Sample Size	75541	65615	55858	44490	31426	18553	6309	457

DVBB1D1 Evera XT

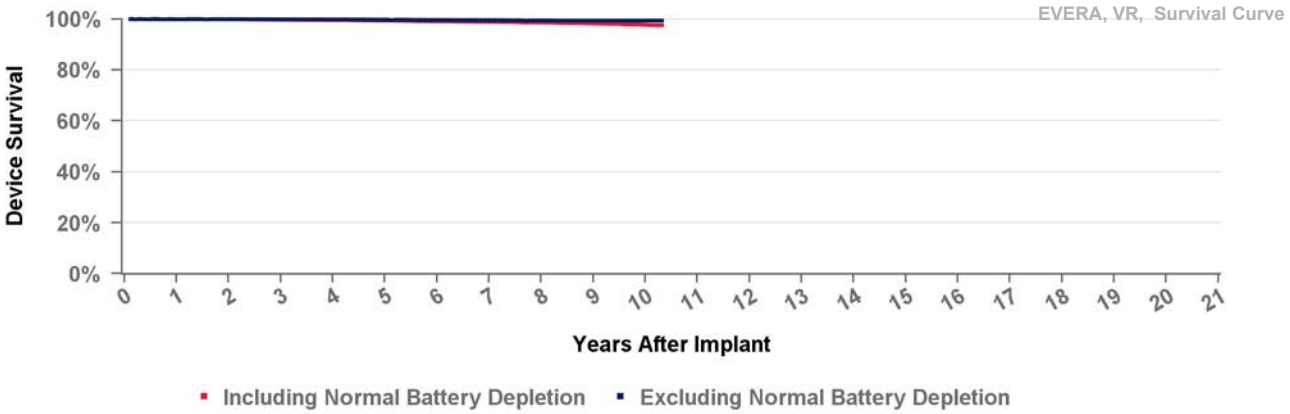
US Market Release	03Apr2013	**Total Malfunctions (USA)**	**72**
CE Approval Date		**Therapy Function Not Compromised**	**51**
Registered USA Implants	32,235	Battery	44
Estimated Active USA Implants	17,878	Electrical Component	7
Normal Battery Depletions	78	**Therapy Function Compromised**	**21**
		Battery	16
		Device-Related Current Pathway	2
		Electrical Component	3



Years	1	2	3	4	5	6	7	8	9	10	at 124 mo
Excluding NBD	100.0%	100.0%	99.9%	99.8%	99.8%	99.6%	99.6%	99.5%	99.4%	99.3%	99.3%
Including NBD	100.0%	99.9%	99.7%	99.6%	99.4%	99.1%	98.9%	98.7%	98.3%	97.7%	97.5%
Effective Sample Size	52431	48794	45402	42247	39173	36002	33070	26184	13541	3207	436

DVBB1D4 Evera XT

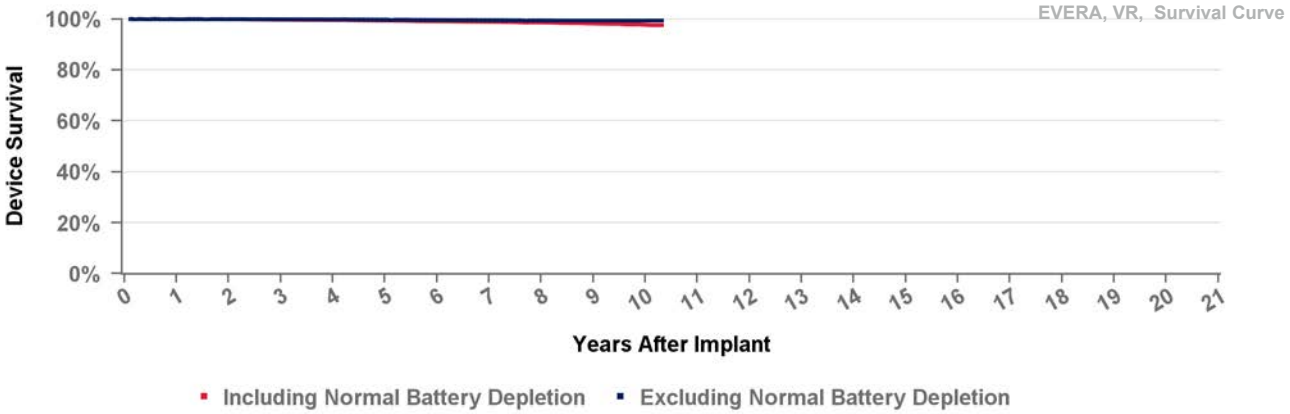
US Market Release	03Apr2013	**Total Malfunctions (USA)**	**91**
CE Approval Date		**Therapy Function Not Compromised**	**60**
Registered USA Implants	43,927	Battery	45
Estimated Active USA Implants	26,362	Electrical Component	9
Normal Battery Depletions	132	Possible Early Battery Depletion	2
		Other	4
		Therapy Function Compromised	**31**
		Battery	26
		Device-Related Current Pathway	4
		Electrical Component	1



Years	1	2	3	4	5	6	7	8	9	10	at 124 mo
Excluding NBD	100.0%	100.0%	99.9%	99.8%	99.8%	99.6%	99.6%	99.5%	99.4%	99.3%	99.3%
Including NBD	100.0%	99.9%	99.7%	99.6%	99.4%	99.1%	98.9%	98.7%	98.3%	97.7%	97.5%
Effective Sample Size	52431	48794	45402	42247	39173	36002	33070	26184	13541	3207	436

DVBB2D1 Evera XT

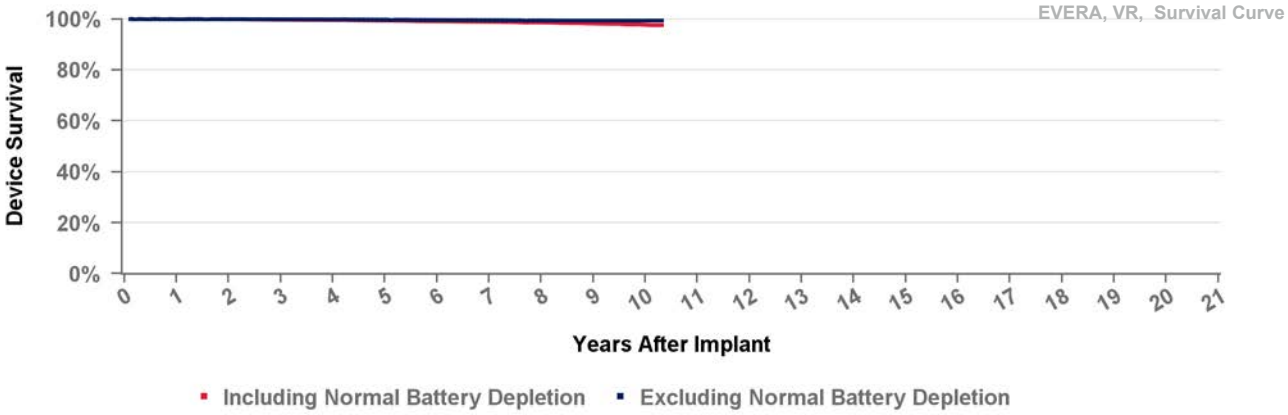
US Market Release		**Total Malfunctions (USA)**	
CE Approval Date	17Dec2012	**Therapy Function Not Compromised**	
Registered USA Implants			
Estimated Active USA Implants		**Therapy Function Compromised**	
Normal Battery Depletions			



Years	1	2	3	4	5	6	7	8	9	10	at 124 mo
Excluding NBD	100.0%	100.0%	99.9%	99.8%	99.8%	99.6%	99.6%	99.5%	99.4%	99.3%	99.3%
Including NBD	100.0%	99.9%	99.7%	99.6%	99.4%	99.1%	98.9%	98.7%	98.3%	97.7%	97.5%
Effective Sample Size	52431	48794	45402	42247	39173	36002	33070	26184	13541	3207	436

DVBB2D4 Evera XT

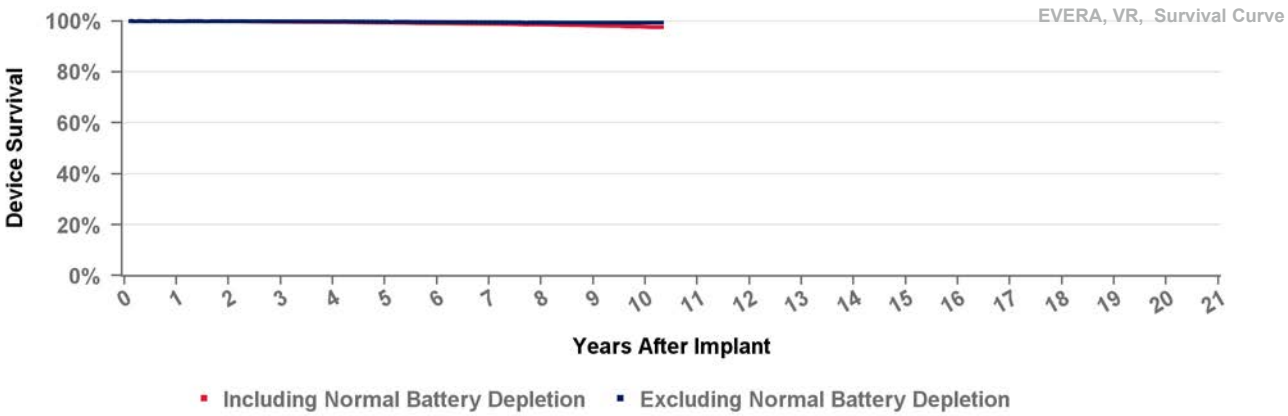
US Market Release		**Total Malfunctions (USA)**	
CE Approval Date	17Dec2012	**Therapy Function Not Compromised**	
Registered USA Implants			
Estimated Active USA Implants		**Therapy Function Compromised**	
Normal Battery Depletions			



Years	1	2	3	4	5	6	7	8	9	10	at 124 mo
Excluding NBD	100.0%	100.0%	99.9%	99.8%	99.8%	99.6%	99.6%	99.5%	99.4%	99.3%	99.3%
Including NBD	100.0%	99.9%	99.7%	99.6%	99.4%	99.1%	98.9%	98.7%	98.3%	97.7%	97.5%
Effective Sample Size	52431	48794	45402	42247	39173	36002	33070	26184	13541	3207	436

DVBC3D1 Evera S

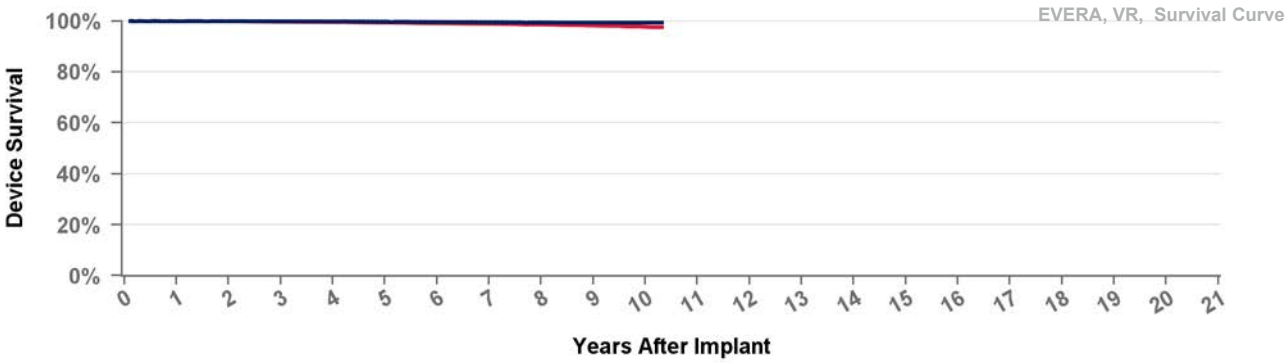
US Market Release	03Apr2013	**Total Malfunctions (USA)**	**28**
CE Approval Date	17Dec2012	**Therapy Function Not Compromised**	**19**
Registered USA Implants	8,961	Battery	17
Estimated Active USA Implants	5,146	Electrical Component	2
Normal Battery Depletions	26	**Therapy Function Compromised**	**9**
		Battery	8
		Electrical Component	1



Years	1	2	3	4	5	6	7	8	9	10	at 124 mo
Excluding NBD	100.0%	100.0%	99.9%	99.8%	99.8%	99.6%	99.6%	99.5%	99.4%	99.3%	99.3%
Including NBD	100.0%	99.9%	99.7%	99.6%	99.4%	99.1%	98.9%	98.7%	98.3%	97.7%	97.5%
Effective Sample Size	52431	48794	45402	42247	39173	36002	33070	26184	13541	3207	436

DVBC3D4 Evera S

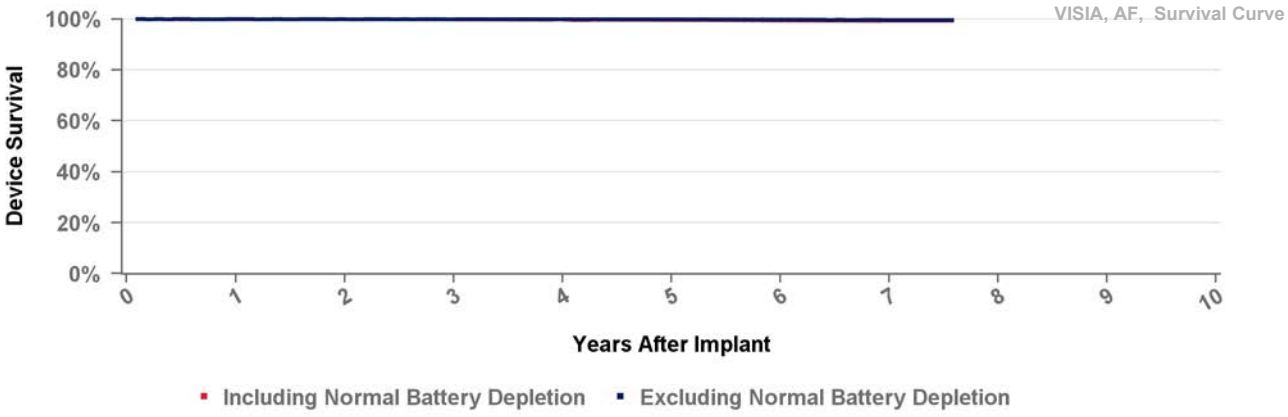
US Market Release	03Apr2013	**Total Malfunctions (USA)**	**20**
CE Approval Date	17Dec2012	**Therapy Function Not Compromised**	**13**
Registered USA Implants	11,103	Battery	10
Estimated Active USA Implants	6,885	Electrical Component	3
Normal Battery Depletions	28	**Therapy Function Compromised**	**7**
		Battery	5
		Device-Related Current Pathway	2



Years	1	2	3	4	5	6	7	8	9	10	at 124 mo
Excluding NBD	100.0%	100.0%	99.9%	99.8%	99.8%	99.6%	99.6%	99.5%	99.4%	99.3%	99.3%
Including NBD	100.0%	99.9%	99.7%	99.6%	99.4%	99.1%	98.9%	98.7%	98.3%	97.7%	97.5%
Effective Sample Size	52431	48794	45402	42247	39173	36002	33070	26184	13541	3207	436

DVFB1D1 Visia MRI AF

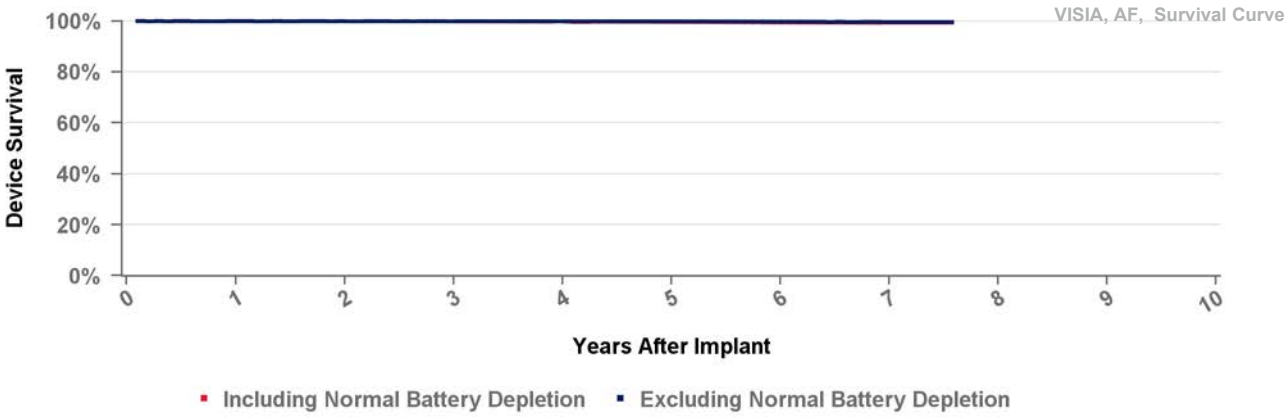
US Market Release	12Oct2016	**Total Malfunctions (USA)**	**18**
CE Approval Date		**Therapy Function Not Compromised**	**12**
Registered USA Implants	21,398	Battery	6
Estimated Active USA Implants	17,286	Device-Related Current Pathway	1
Normal Battery Depletions	12	Electrical Component	4
		Other	1
		Therapy Function Compromised	**6**
		Battery	2
		Device-Related Current Pathway	2
		Electrical Component	2



Years	1	2	3	4	5	6	7	at 91 mo
Excluding NBD	100.0%	100.0%	100.0%	99.9%	99.9%	99.8%	99.7%	99.7%
Including NBD	100.0%	99.9%	99.9%	99.8%	99.7%	99.4%	99.3%	99.3%
Effective Sample Size	75541	65615	55858	44490	31426	18553	6309	457

DVFB1D4 Visia MRI AF

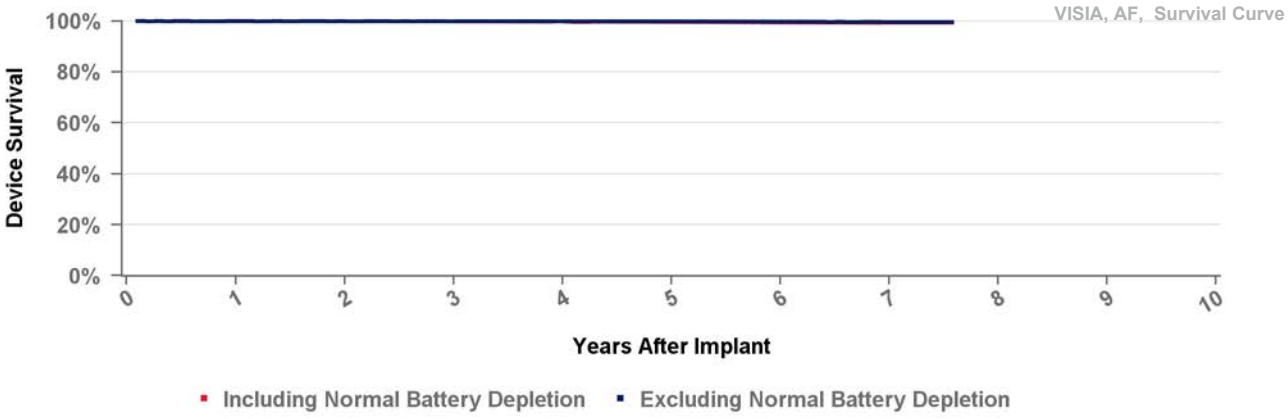
US Market Release	19Jan2016	**Total Malfunctions (USA)**	**67**
CE Approval Date		**Therapy Function Not Compromised**	**41**
Registered USA Implants	71,460	Battery	31
Estimated Active USA Implants	57,116	Electrical Component	9
Normal Battery Depletions	31	Other	1
		Therapy Function Compromised	**26**
		Battery	14
		Device-Related Current Pathway	9
		Electrical Component	3



Years	1	2	3	4	5	6	7	at 91 mo
Excluding NBD	100.0%	100.0%	100.0%	99.9%	99.9%	99.8%	99.7%	99.7%
Including NBD	100.0%	99.9%	99.9%	99.8%	99.7%	99.4%	99.3%	99.3%
Effective Sample Size	75541	65615	55858	44490	31426	18553	6309	457

DVFB2D1 Visia MRI AF XT

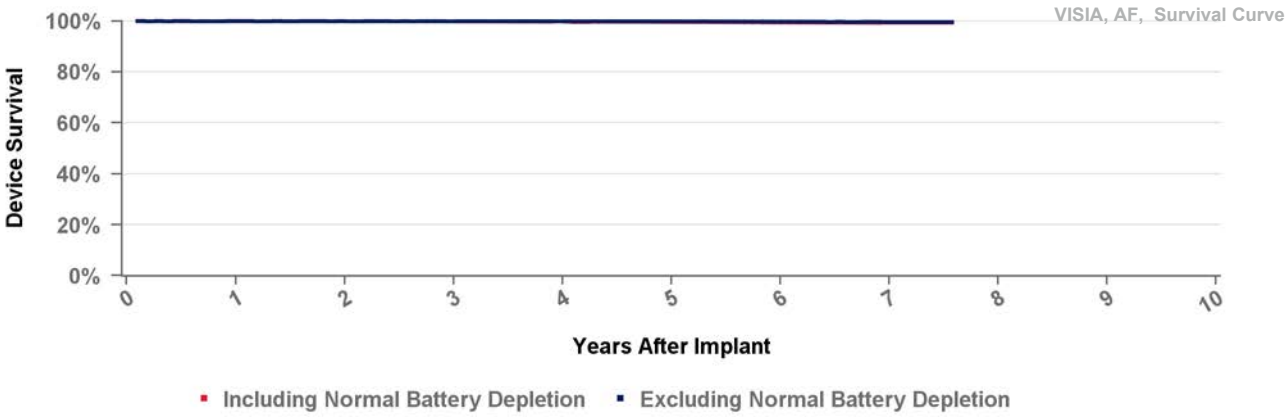
US Market Release		**Total Malfunctions (USA)**	
CE Approval Date	05Sep2016	**Therapy Function Not Compromised**	
Registered USA Implants			
Estimated Active USA Implants		**Therapy Function Compromised**	
Normal Battery Depletions			



Years	1	2	3	4	5	6	7	at 91 mo
Excluding NBD	100.0%	100.0%	100.0%	99.9%	99.9%	99.8%	99.7%	99.7%
Including NBD	100.0%	99.9%	99.9%	99.8%	99.7%	99.4%	99.3%	99.3%
Effective Sample Size	75541	65615	55858	44490	31426	18553	6309	457

DVFB2D4 Visia MRI AF XT

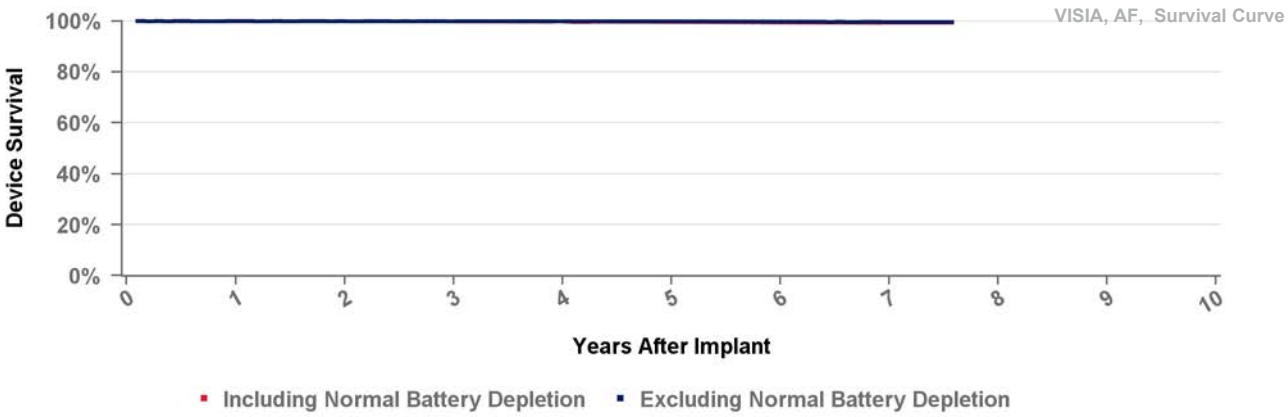
US Market Release		**Total Malfunctions (USA)**	
CE Approval Date	19Oct2015	**Therapy Function Not Compromised**	
Registered USA Implants	2		
Estimated Active USA Implants	1	**Therapy Function Compromised**	
Normal Battery Depletions			



Years	1	2	3	4	5	6	7	at 91 mo
Excluding NBD	100.0%	100.0%	100.0%	99.9%	99.9%	99.8%	99.7%	99.7%
Including NBD	100.0%	99.9%	99.9%	99.8%	99.7%	99.4%	99.3%	99.3%
Effective Sample Size	75541	65615	55858	44490	31426	18553	6309	457

DVFC3D1 Visia MRI AF S

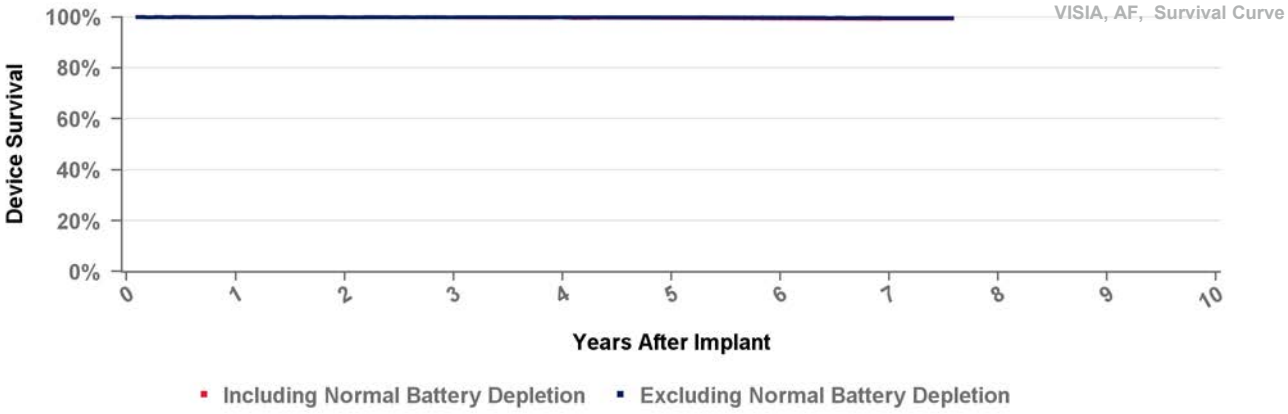
US Market Release	12Oct2016	**Total Malfunctions (USA)**	
CE Approval Date	05Sep2016	**Therapy Function Not Compromised**	
Registered USA Implants	1,704		
Estimated Active USA Implants	1,423	**Therapy Function Compromised**	
Normal Battery Depletions			



Years	1	2	3	4	5	6	7	at 91 mo
Excluding NBD	100.0%	100.0%	100.0%	99.9%	99.9%	99.8%	99.7%	99.7%
Including NBD	100.0%	99.9%	99.9%	99.8%	99.7%	99.4%	99.3%	99.3%
Effective Sample Size	75541	65615	55858	44490	31426	18553	6309	457

DVFC3D4 Visia MRI AF S

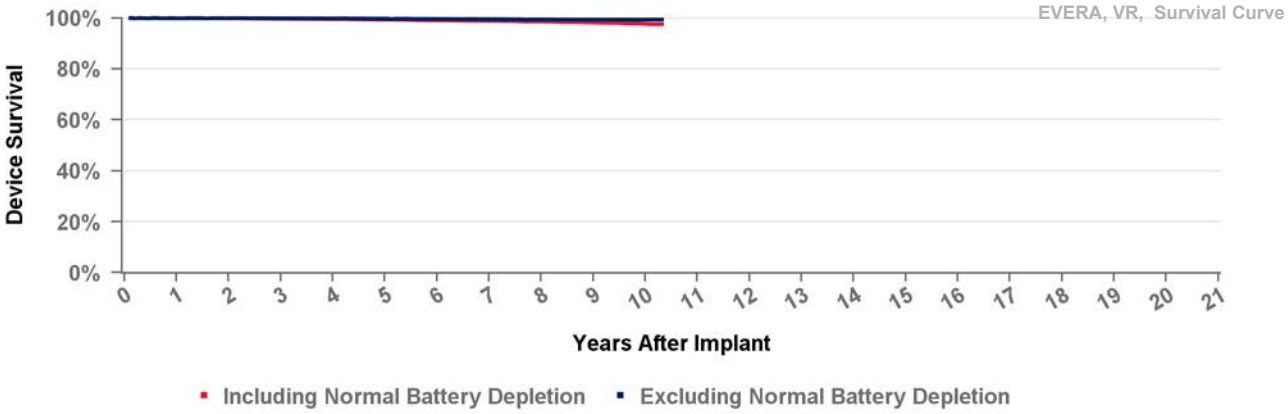
US Market Release	19Jan2016	**Total Malfunctions (USA)**	**4**
CE Approval Date	19Oct2015	**Therapy Function Not Compromised**	**4**
Registered USA Implants	4,142	Battery	4
Estimated Active USA Implants	3,467	**Therapy Function Compromised**	**0**
Normal Battery Depletions	5		



Years	1	2	3	4	5	6	7	at 91 mo
Excluding NBD	100.0%	100.0%	100.0%	99.9%	99.9%	99.8%	99.7%	99.7%
Including NBD	100.0%	99.9%	99.9%	99.8%	99.7%	99.4%	99.3%	99.3%
Effective Sample Size	75541	65615	55858	44490	31426	18553	6309	457

DVMB1D4 Evera MRI XT

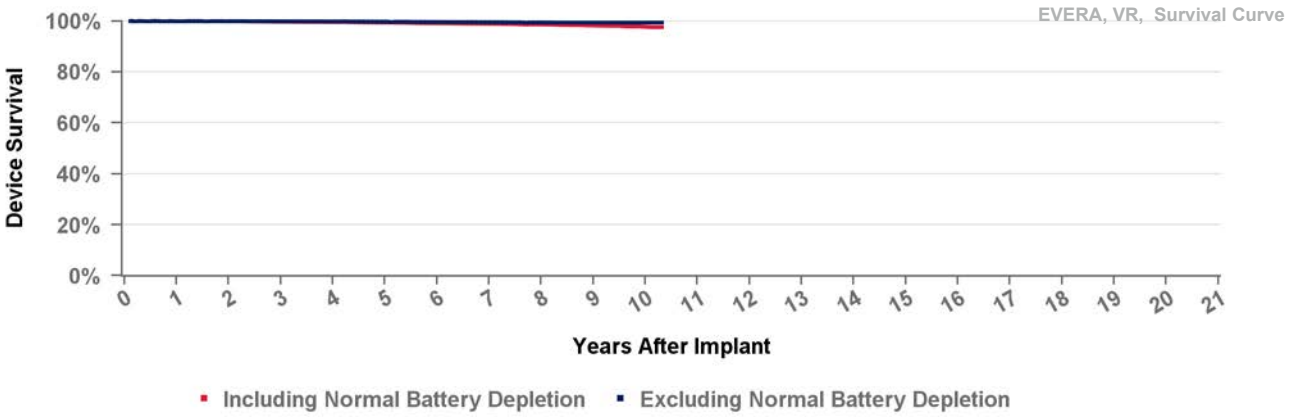
US Market Release	11Sep2015	**Total Malfunctions (USA)**	**34**
CE Approval Date		**Therapy Function Not Compromised**	**16**
Registered USA Implants	20,550	Battery	12
Estimated Active USA Implants	13,817	Electrical Component	3
Normal Battery Depletions	18	Other	1
		Therapy Function Compromised	**18**
		Battery	14
		Device-Related Current Pathway	4



Years	1	2	3	4	5	6	7	8	9	10	at 124 mo
Excluding NBD	100.0%	100.0%	99.9%	99.8%	99.8%	99.6%	99.6%	99.5%	99.4%	99.3%	99.3%
Including NBD	100.0%	99.9%	99.7%	99.6%	99.4%	99.1%	98.9%	98.7%	98.3%	97.7%	97.5%
Effective Sample Size	52431	48794	45402	42247	39173	36002	33070	26184	13541	3207	436

DVMB2D1 Evera MRI XT

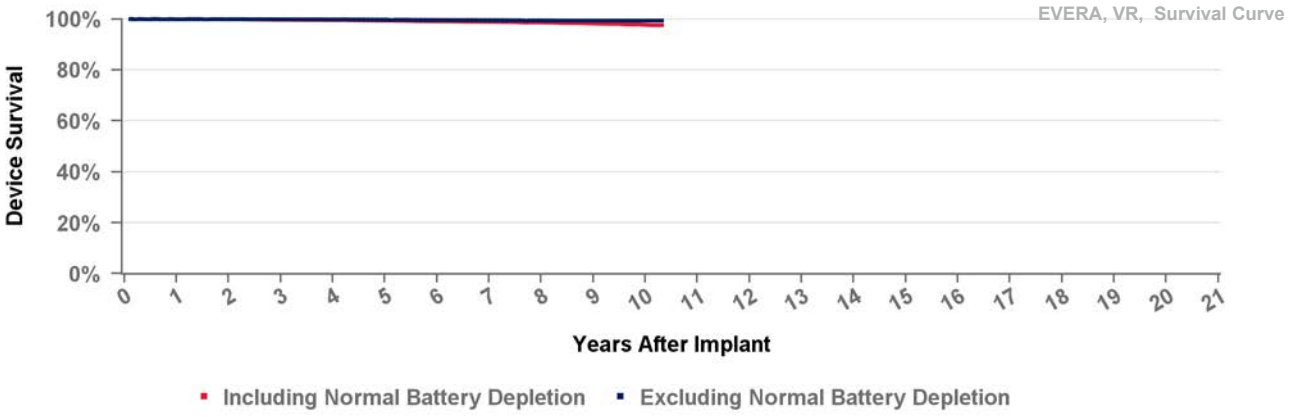
US Market Release		**Total Malfunctions (USA)**	
CE Approval Date	05Sep2016	**Therapy Function Not Compromised**	
Registered USA Implants			
Estimated Active USA Implants		**Therapy Function Compromised**	
Normal Battery Depletions			



Years	1	2	3	4	5	6	7	8	9	10	at 124 mo
Excluding NBD	100.0%	100.0%	99.9%	99.8%	99.8%	99.6%	99.6%	99.5%	99.4%	99.3%	99.3%
Including NBD	100.0%	99.9%	99.7%	99.6%	99.4%	99.1%	98.9%	98.7%	98.3%	97.7%	97.5%
Effective Sample Size	52431	48794	45402	42247	39173	36002	33070	26184	13541	3207	436

DVMB2D4 Evera MRI XT

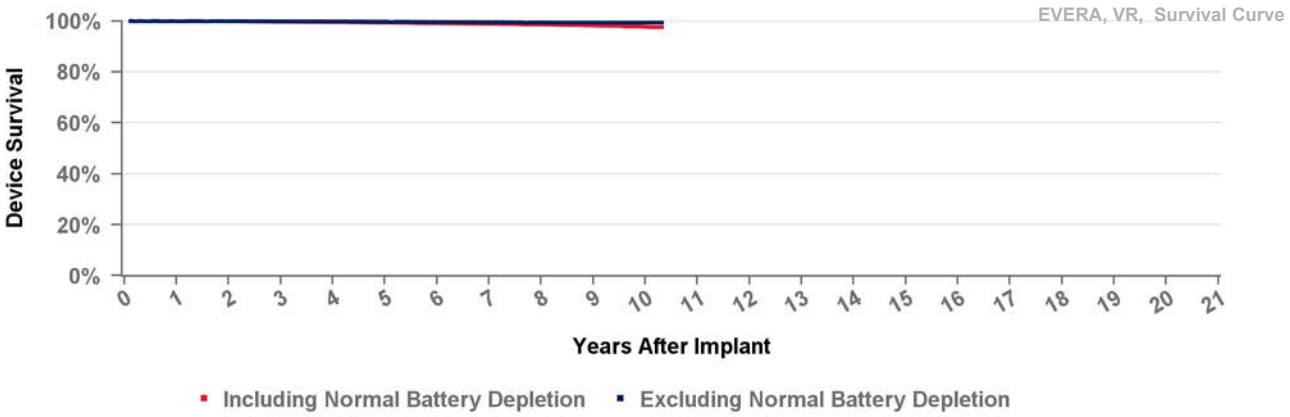
US Market Release		**Total Malfunctions (USA)**	
CE Approval Date	31Mar2014	**Therapy Function Not Compromised**	
Registered USA Implants	2		
Estimated Active USA Implants		**Therapy Function Compromised**	
Normal Battery Depletions			



Years	1	2	3	4	5	6	7	8	9	10	at 124 mo
Excluding NBD	100.0%	100.0%	99.9%	99.8%	99.8%	99.6%	99.6%	99.5%	99.4%	99.3%	99.3%
Including NBD	100.0%	99.9%	99.7%	99.6%	99.4%	99.1%	98.9%	98.7%	98.3%	97.7%	97.5%
Effective Sample Size	52431	48794	45402	42247	39173	36002	33070	26184	13541	3207	436

DVMC3D1 Evera MRI S

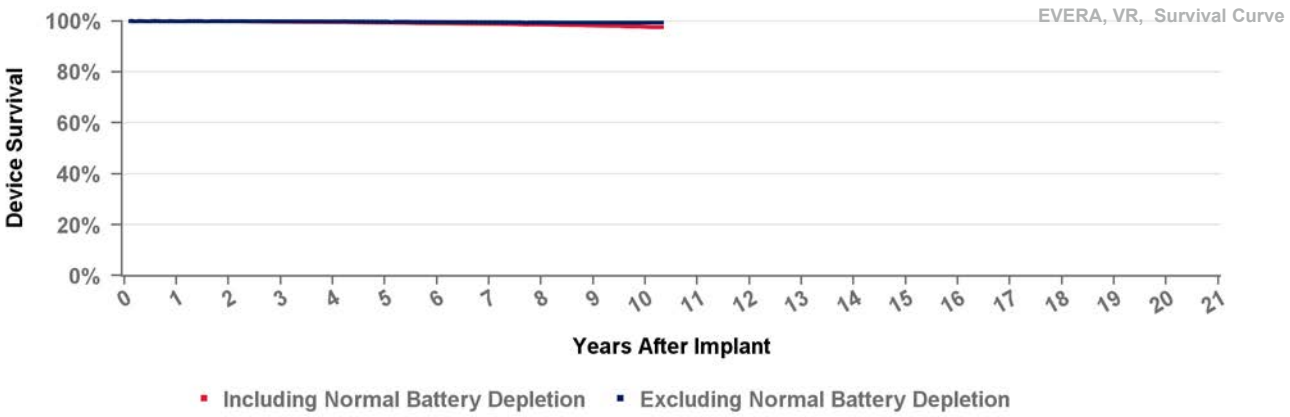
US Market Release	12Oct2016	**Total Malfunctions (USA)**	
CE Approval Date	05Sep2016	**Therapy Function Not Compromised**	
Registered USA Implants			
Estimated Active USA Implants		**Therapy Function Compromised**	
Normal Battery Depletions			



Years	1	2	3	4	5	6	7	8	9	10	at 124 mo
Excluding NBD	100.0%	100.0%	99.9%	99.8%	99.8%	99.6%	99.6%	99.5%	99.4%	99.3%	99.3%
Including NBD	100.0%	99.9%	99.7%	99.6%	99.4%	99.1%	98.9%	98.7%	98.3%	97.7%	97.5%
Effective Sample Size	52431	48794	45402	42247	39173	36002	33070	26184	13541	3207	436

DVMC3D4 Evera MRI S

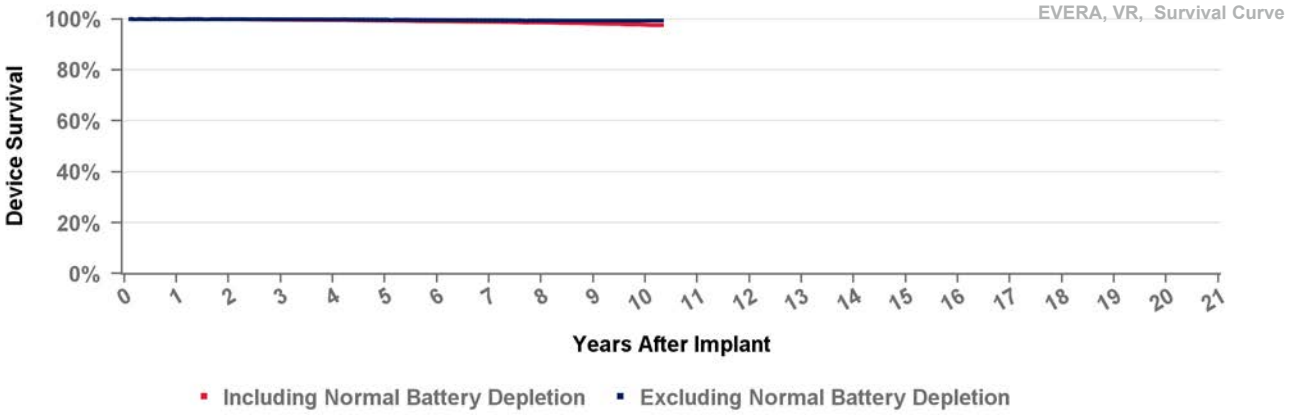
US Market Release	11Sep2015	**Total Malfunctions (USA)**	
CE Approval Date	31Mar2014	**Therapy Function Not Compromised**	
Registered USA Implants			
Estimated Active USA Implants		**Therapy Function Compromised**	
Normal Battery Depletions			



Years	1	2	3	4	5	6	7	8	9	10	at 124 mo
Excluding NBD	100.0%	100.0%	99.9%	99.8%	99.8%	99.6%	99.6%	99.5%	99.4%	99.3%	99.3%
Including NBD	100.0%	99.9%	99.7%	99.6%	99.4%	99.1%	98.9%	98.7%	98.3%	97.7%	97.5%
Effective Sample Size	52431	48794	45402	42247	39173	36002	33070	26184	13541	3207	436

DVMD3D1 Primo

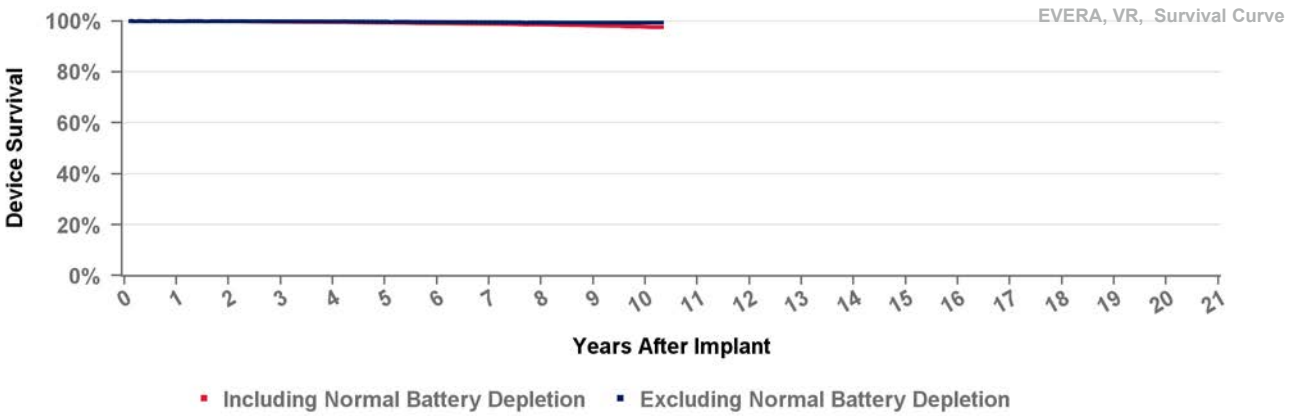
US Market Release	01Mar2018	**Total Malfunctions (USA)**	
CE Approval Date	10Nov2017	**Therapy Function Not Compromised**	
Registered USA Implants	274		
Estimated Active USA Implants	245	**Therapy Function Compromised**	
Normal Battery Depletions			



Years	1	2	3	4	5	6	7	8	9	10	at 124 mo
Excluding NBD	100.0%	100.0%	99.9%	99.8%	99.8%	99.6%	99.6%	99.5%	99.4%	99.3%	99.3%
Including NBD	100.0%	99.9%	99.7%	99.6%	99.4%	99.1%	98.9%	98.7%	98.3%	97.7%	97.5%
Effective Sample Size	52431	48794	45402	42247	39173	36002	33070	26184	13541	3207	436

DVMD3D4 Primo

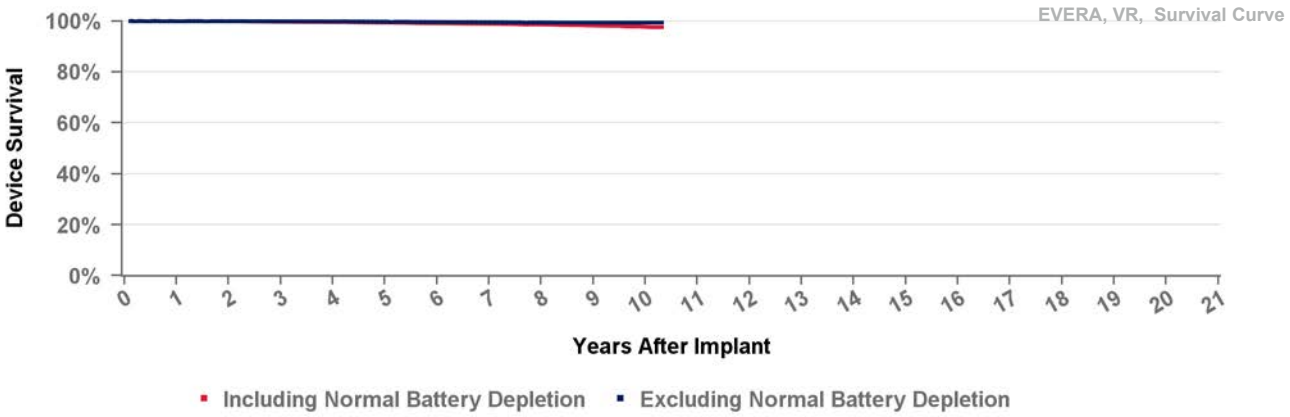
US Market Release	01Mar2018	**Total Malfunctions (USA)**	
CE Approval Date	10Nov2017	**Therapy Function Not Compromised**	
Registered USA Implants	607		
Estimated Active USA Implants	556	**Therapy Function Compromised**	
Normal Battery Depletions			



Years	1	2	3	4	5	6	7	8	9	10	at 124 mo
Excluding NBD	100.0%	100.0%	99.9%	99.8%	99.8%	99.6%	99.6%	99.5%	99.4%	99.3%	99.3%
Including NBD	100.0%	99.9%	99.7%	99.6%	99.4%	99.1%	98.9%	98.7%	98.3%	97.7%	97.5%
Effective Sample Size	52431	48794	45402	42247	39173	36002	33070	26184	13541	3207	436

DVME3D1 Mirro

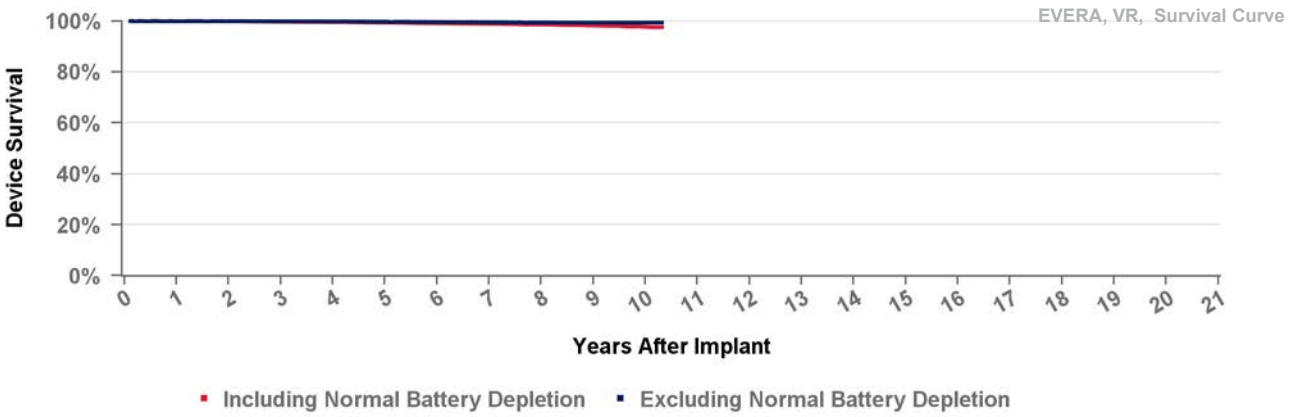
US Market Release	01Mar2018	**Total Malfunctions (USA)**	
CE Approval Date	10Nov2017	**Therapy Function Not Compromised**	
Registered USA Implants			
Estimated Active USA Implants		**Therapy Function Compromised**	
Normal Battery Depletions			



Years	1	2	3	4	5	6	7	8	9	10	at 124 mo
Excluding NBD	100.0%	100.0%	99.9%	99.8%	99.8%	99.6%	99.6%	99.5%	99.4%	99.3%	99.3%
Including NBD	100.0%	99.9%	99.7%	99.6%	99.4%	99.1%	98.9%	98.7%	98.3%	97.7%	97.5%
Effective Sample Size	52431	48794	45402	42247	39173	36002	33070	26184	13541	3207	436

DVME3D4 Mirro

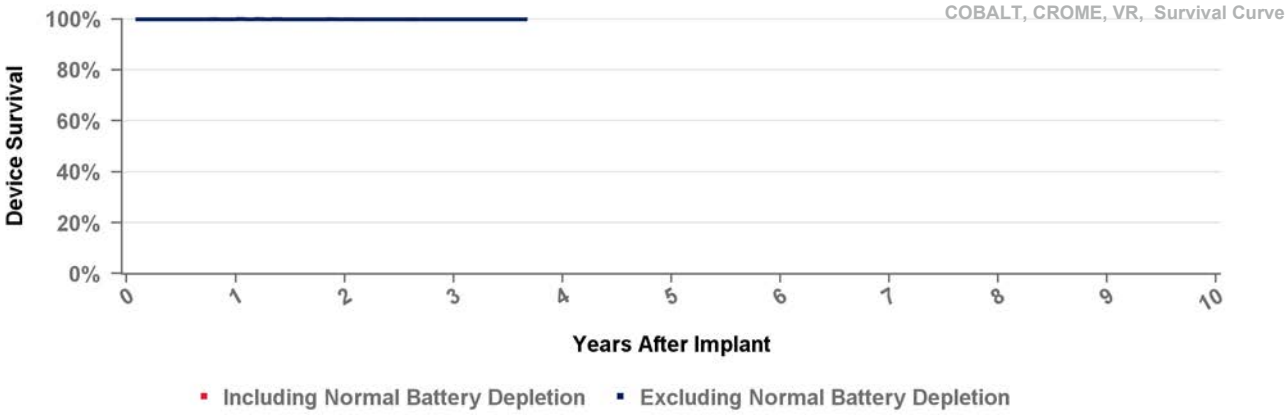
US Market Release	01Mar2018	**Total Malfunctions (USA)**	
CE Approval Date	10Nov2017	**Therapy Function Not Compromised**	
Registered USA Implants			
Estimated Active USA Implants		**Therapy Function Compromised**	
Normal Battery Depletions			



Years	1	2	3	4	5	6	7	8	9	10	at 124 mo
Excluding NBD	100.0%	100.0%	99.9%	99.8%	99.8%	99.6%	99.6%	99.5%	99.4%	99.3%	99.3%
Including NBD	100.0%	99.9%	99.7%	99.6%	99.4%	99.1%	98.9%	98.7%	98.3%	97.7%	97.5%
Effective Sample Size	52431	48794	45402	42247	39173	36002	33070	26184	13541	3207	436

DVPA2D1 Cobalt XT

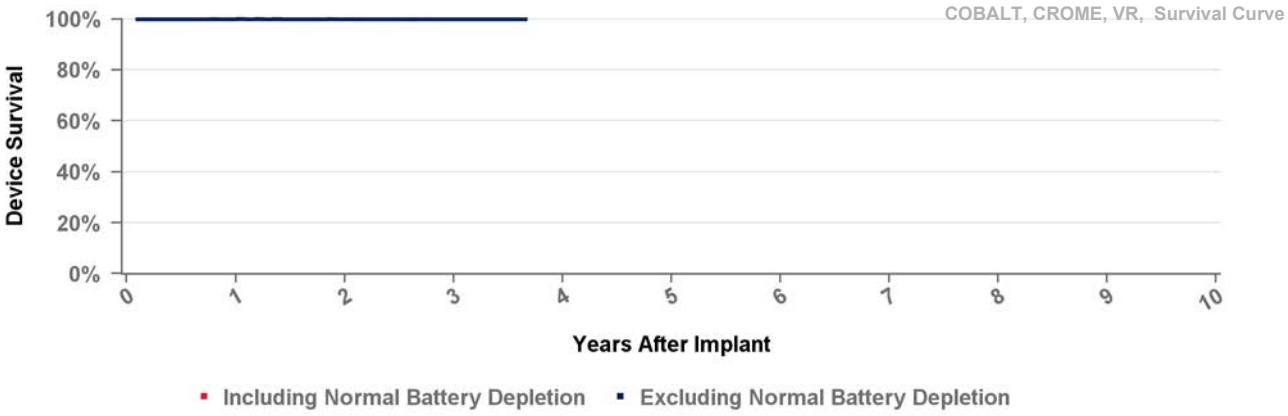
US Market Release	23Apr2020	**Total Malfunctions (USA)**	
CE Approval Date	18Dec2019	**Therapy Function Not Compromised**	
Registered USA Implants	2,821		
Estimated Active USA Implants	2,658	**Therapy Function Compromised**	
Normal Battery Depletions	2		



Years	1	2	3	at 44 mo
Excluding NBD	100.0%	99.9%	99.9%	99.9%
Including NBD	100.0%	99.9%	99.8%	99.8%
Effective Sample Size	12093	7419	2270	190

DVPA2D4 Cobalt XT

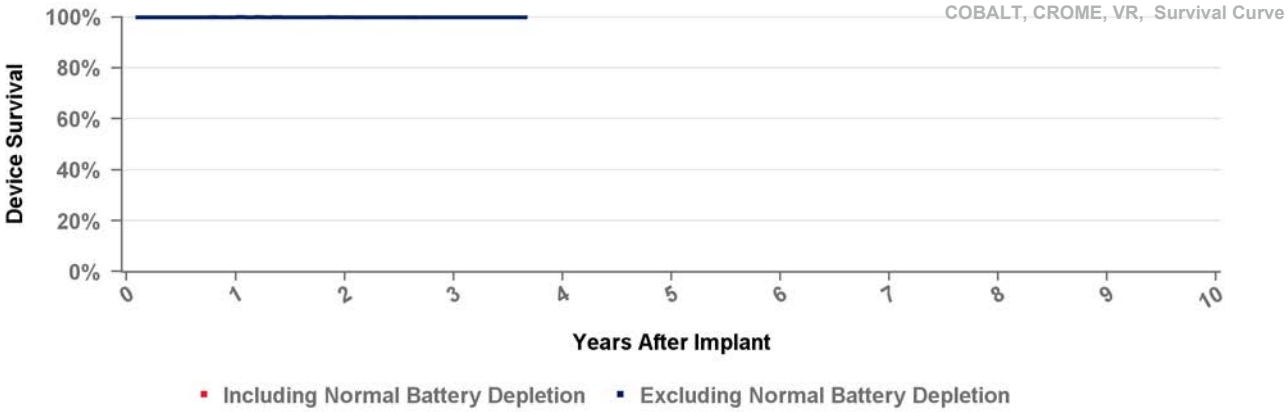
US Market Release	23Apr2020	**Total Malfunctions (USA)**	**1**
CE Approval Date	18Dec2019	**Therapy Function Not Compromised**	**0**
Registered USA Implants	18,387		
Estimated Active USA Implants	17,569	**Therapy Function Compromised**	**1**
Normal Battery Depletions		Device-Related Current Pathway	1



Years	1	2	3	at 44 mo
Excluding NBD	100.0%	99.9%	99.9%	99.9%
Including NBD	100.0%	99.9%	99.8%	99.8%
Effective Sample Size	12093	7419	2270	190

DVPB3D1 Cobalt

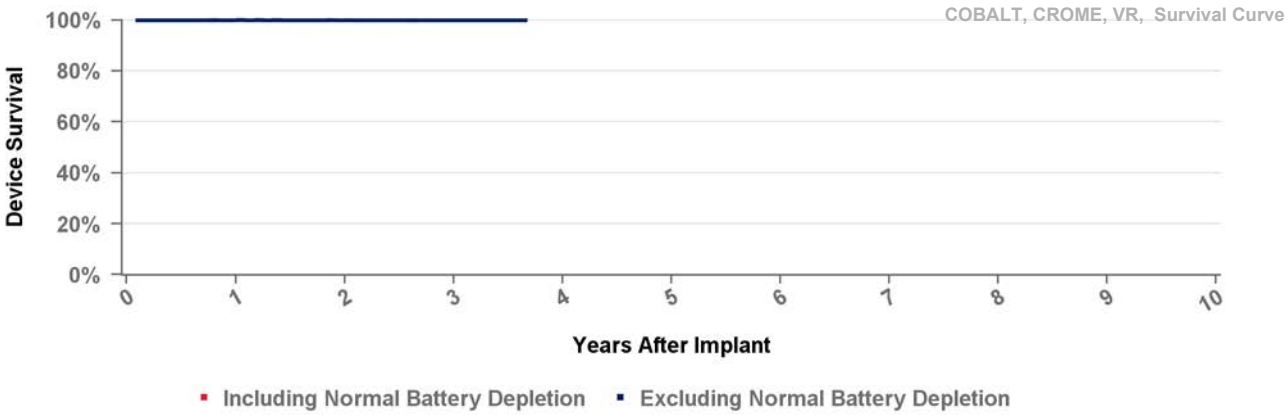
US Market Release	23Apr2020	**Total Malfunctions (USA)**	**2**
CE Approval Date	18Dec2019	**Therapy Function Not Compromised**	**0**
Registered USA Implants	3,180		
Estimated Active USA Implants	2,934	**Therapy Function Compromised**	**2**
Normal Battery Depletions		Electrical Interconnect	2



Years	1	2	3	at 44 mo
Excluding NBD	100.0%	99.9%	99.9%	99.9%
Including NBD	100.0%	99.9%	99.8%	99.8%
Effective Sample Size	12093	7419	2270	190

DVPB3D4 Cobalt

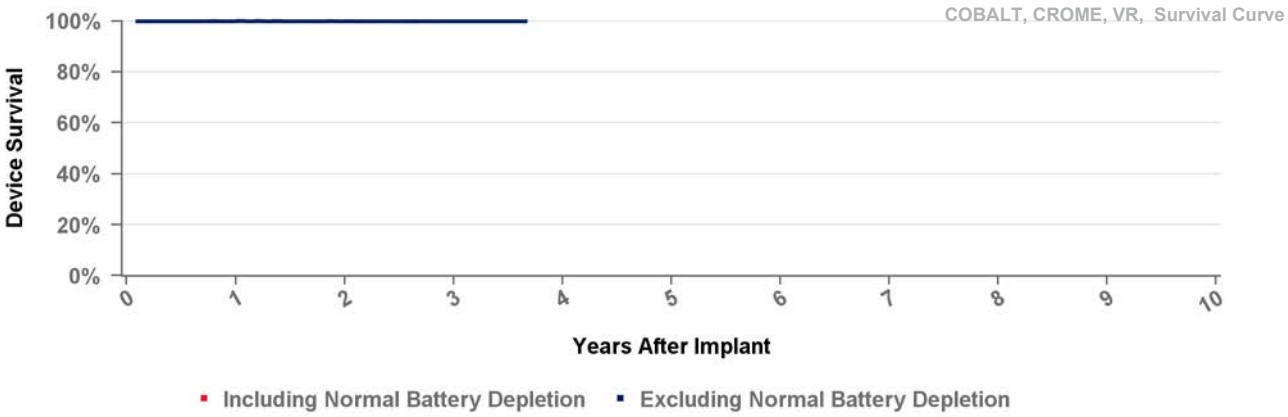
US Market Release	23Apr2020	**Total Malfunctions (USA)**	**4**
CE Approval Date	18Dec2019	**Therapy Function Not Compromised**	**1**
Registered USA Implants	10,491	Other	1
Estimated Active USA Implants	9,791	**Therapy Function Compromised**	**3**
Normal Battery Depletions	2	Device-Related Current Pathway	2
		Electrical Interconnect	1



Years	1	2	3	at 44 mo
Excluding NBD	100.0%	99.9%	99.9%	99.9%
Including NBD	100.0%	99.9%	99.8%	99.8%
Effective Sample Size	12093	7419	2270	190

DVPC3D1 Crome

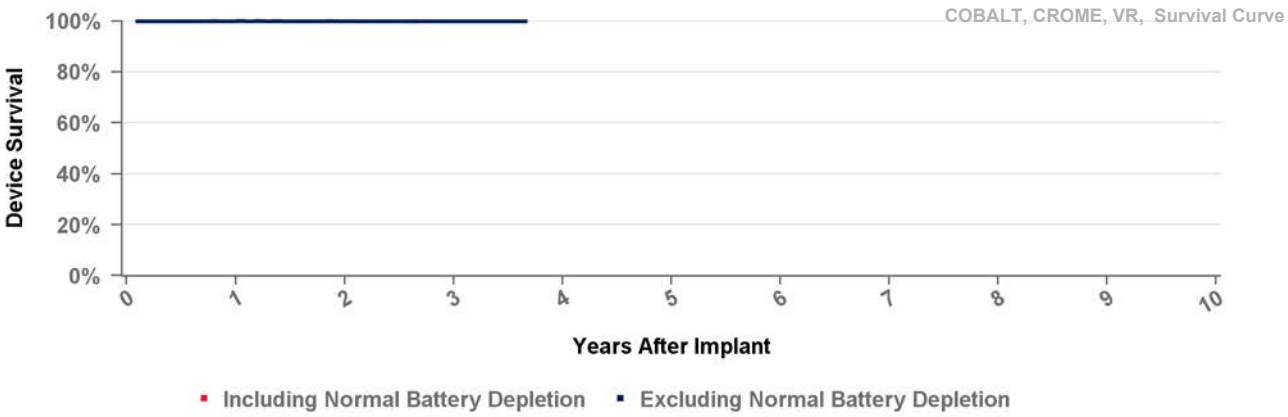
US Market Release	23Apr2020	**Total Malfunctions (USA)**	
CE Approval Date	18Dec2019	**Therapy Function Not Compromised**	
Registered USA Implants	260		
Estimated Active USA Implants	242	**Therapy Function Compromised**	
Normal Battery Depletions			



Years	1	2	3	at 44 mo
Excluding NBD	100.0%	99.9%	99.9%	99.9%
Including NBD	100.0%	99.9%	99.8%	99.8%
Effective Sample Size	12093	7419	2270	190

DVPC3D4 Crome

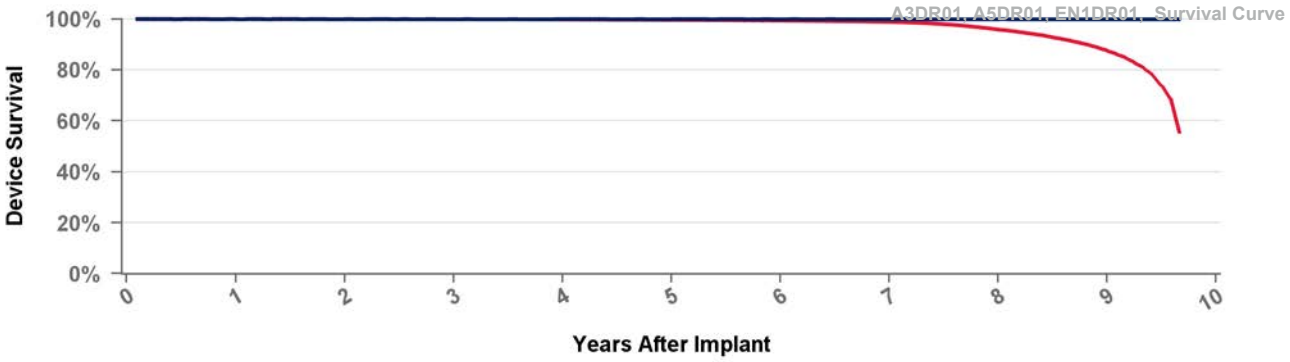
US Market Release	23Apr2020	**Total Malfunctions (USA)**	
CE Approval Date	18Dec2019	**Therapy Function Not Compromised**	
Registered USA Implants	955		
Estimated Active USA Implants	889	**Therapy Function Compromised**	
Normal Battery Depletions			



Years	1	2	3	at 44 mo
Excluding NBD	100.0%	99.9%	99.9%	99.9%
Including NBD	100.0%	99.9%	99.8%	99.8%
Effective Sample Size	12093	7419	2270	190

A2DR01 Advisa DR MRI

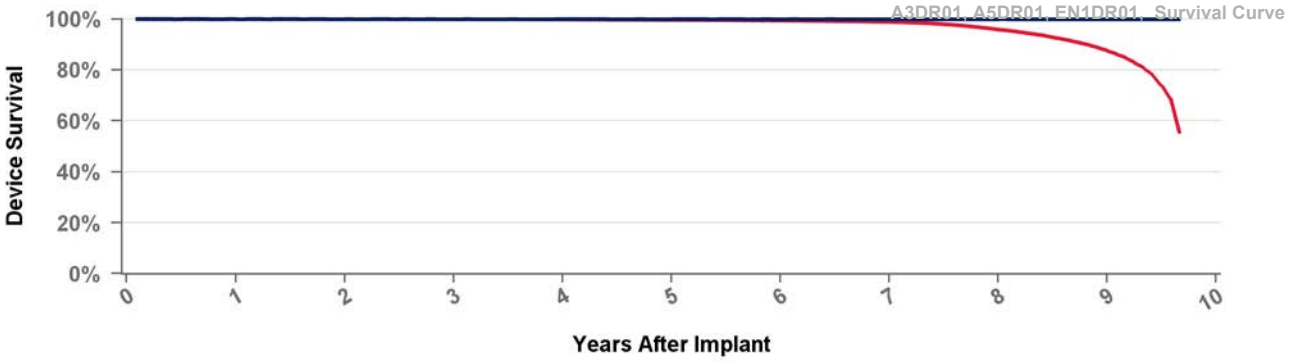
US Market Release	15Jan2013	**Total Malfunctions (USA)**	**80**
CE Approval Date		**Therapy Function Not Compromised**	**75**
Registered USA Implants	344,413	Battery	1
Estimated Active USA Implants	217,681	Electrical Component	38
Normal Battery Depletions	6,817	Electrical Interconnect	4
		Possible Early Battery Depletion	23
		Software/Firmware	6
		Other	3
		Therapy Function Compromised	**5**
		Electrical Component	5



Years	1	2	3	4	5	6	7	8	9	at 116 mo
Excluding NBD	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Including NBD	100.0%	99.9%	99.9%	99.8%	99.7%	99.4%	98.9%	95.9%	87.6%	55.5%
Effective Sample Size	308538	290678	273742	256730	237337	215434	151447	83731	27980	1468

A3DR01 Advisa DR MRI

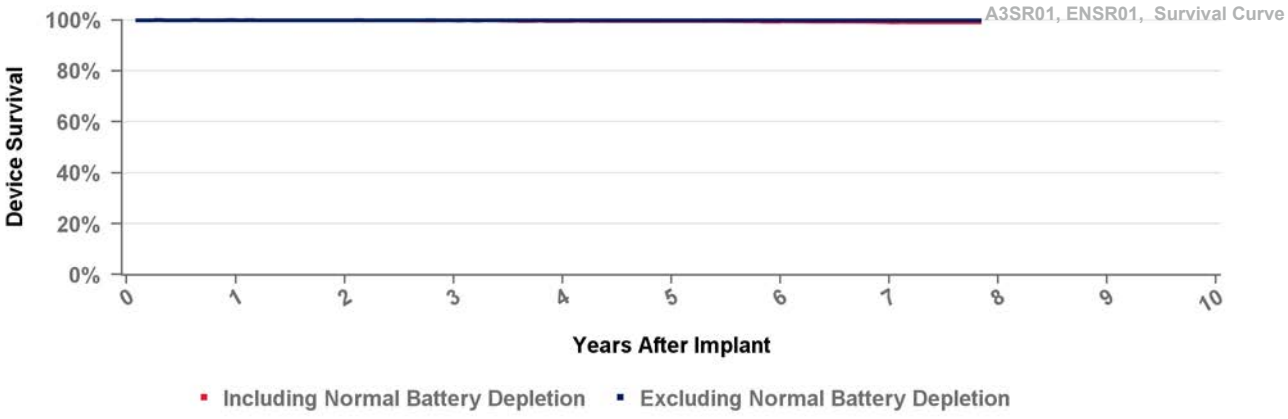
US Market Release		**Total Malfunctions (USA)**	
CE Approval Date	02Jun2009	**Therapy Function Not Compromised**	
Registered USA Implants	22		
Estimated Active USA Implants	3	**Therapy Function Compromised**	
Normal Battery Depletions	4		



Years	1	2	3	4	5	6	7	8	9	at 116 mo
Excluding NBD	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Including NBD	100.0%	99.9%	99.9%	99.8%	99.7%	99.4%	98.9%	95.9%	87.6%	55.5%
Effective Sample Size	308538	290678	273742	256730	237337	215434	151447	83731	27980	1468

A3SR01 Advisa SR MRI

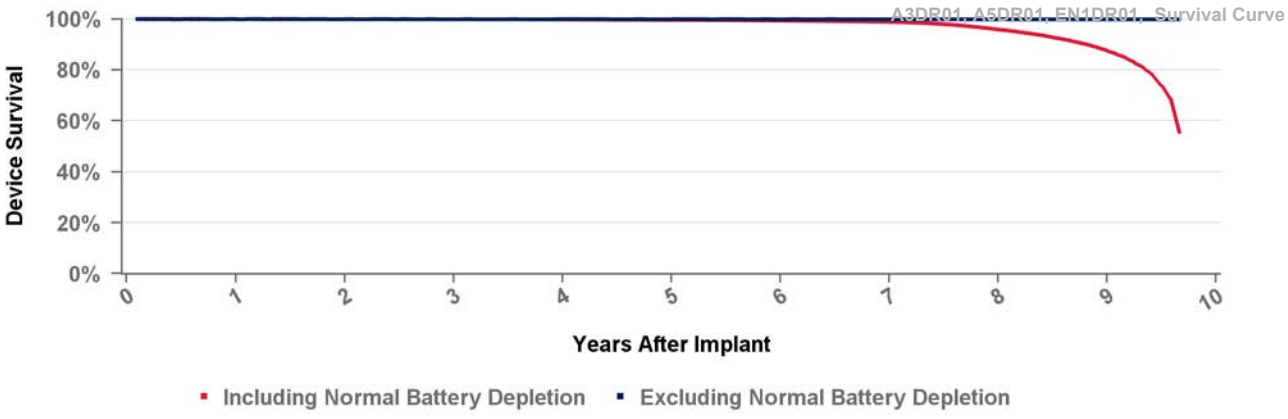
US Market Release	19Mar2015	**Total Malfunctions (USA)**	**9**
CE Approval Date	24Apr2014	**Therapy Function Not Compromised**	**8**
Registered USA Implants	28,082	Electrical Component	3
Estimated Active USA Implants	15,906	Electrical Interconnect	1
Normal Battery Depletions	50	Possible Early Battery Depletion	2
		Other	2
		Therapy Function Compromised	**1**
		Electrical Component	1



Years	1	2	3	4	5	6	7	at 94 mo
Excluding NBD	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Including NBD	99.9%	99.9%	99.8%	99.7%	99.6%	99.5%	99.2%	99.1%
Effective Sample Size	22041	19395	17206	15023	12900	10832	5150	267

A5DR01 Advisa DR

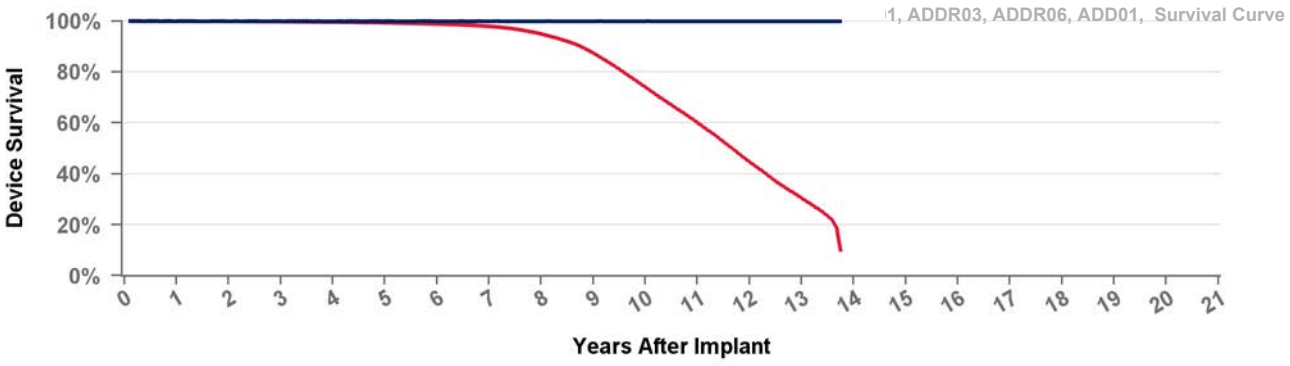
US Market Release		**Total Malfunctions (USA)**	
CE Approval Date	02Jun2009	**Therapy Function Not Compromised**	
Registered USA Implants			
Estimated Active USA Implants		**Therapy Function Compromised**	
Normal Battery Depletions			



Years	1	2	3	4	5	6	7	8	9	at 116 mo
Excluding NBD	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Including NBD	100.0%	99.9%	99.9%	99.8%	99.7%	99.4%	98.9%	95.9%	87.6%	55.5%
Effective Sample Size	308538	290678	273742	256730	237337	215434	151447	83731	27980	1468

ADD01 Adapta D

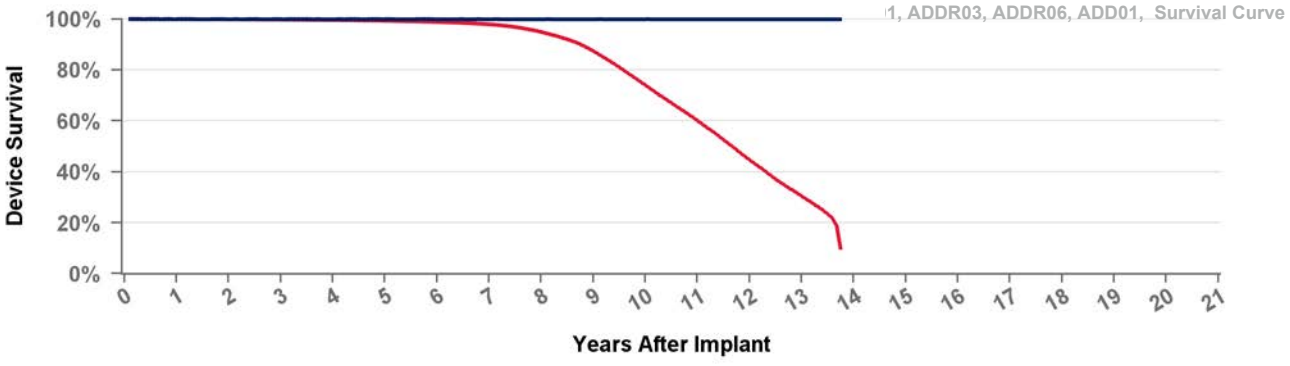
US Market Release	17Jul2006	**Total Malfunctions (USA)**	
CE Approval Date	20Sep2005	**Therapy Function Not Compromised**	
Registered USA Implants	1		
Estimated Active USA Implants		**Therapy Function Compromised**	
Normal Battery Depletions			



Years	1	2	3	4	5	6	7	8	9	10	11	12	13	at 165 mo
Excluding NBD	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Including NBD	99.9%	99.9%	99.8%	99.6%	99.3%	98.8%	97.9%	94.9%	87.4%	74.0%	60.0%	44.6%	30.4%	10.0%
Effective Sample Size	393188	365289	338762	312876	288852	264644	237966	204738	161786	112637	69401	34152	11220	215

ADDR01 Adapta DR

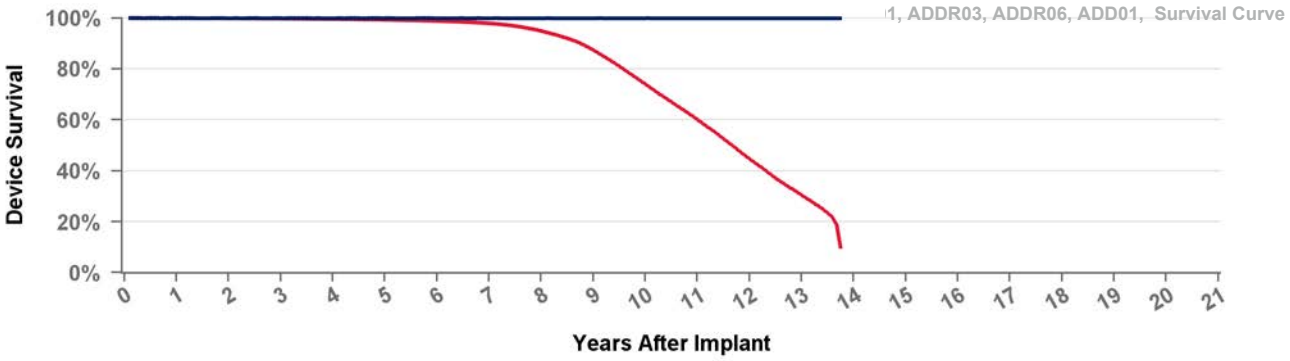
US Market Release	17Jul2006	**Total Malfunctions (USA)**	**94**
CE Approval Date	20Sep2005	**Therapy Function Not Compromised**	**66**
Registered USA Implants	454,871	Electrical Component	58
Estimated Active USA Implants	123,591	Electrical Interconnect	1
Normal Battery Depletions	49,360	Possible Early Battery Depletion	6
		Other	1
		Therapy Function Compromised	**28**
		Electrical Component	23
		Electrical Interconnect	3
		Other	2



Years	1	2	3	4	5	6	7	8	9	10	11	12	13	at 165 mo
Excluding NBD	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Including NBD	99.9%	99.9%	99.8%	99.6%	99.3%	98.8%	97.9%	94.9%	87.4%	74.0%	60.0%	44.6%	30.4%	10.0%
Effective Sample Size	393188	365289	338762	312876	288852	264644	237966	204738	161786	112637	69401	34152	11220	215

ADDR03 Adapta DR

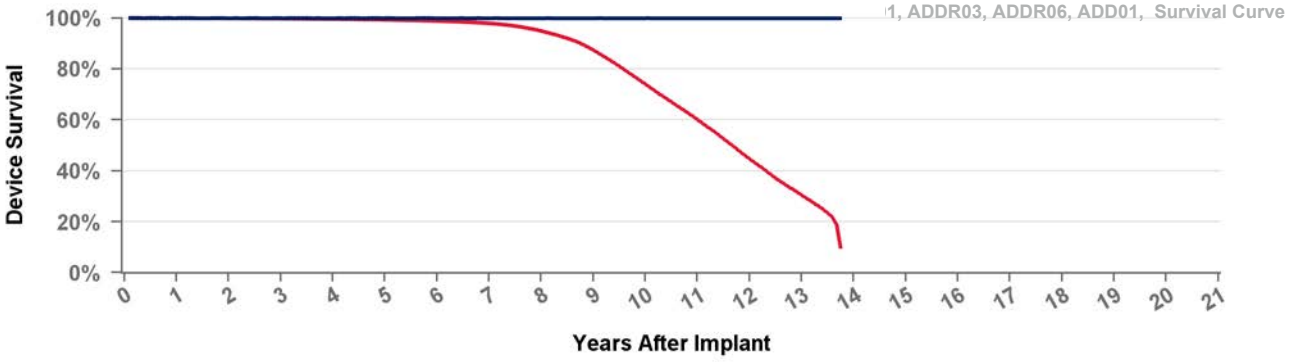
US Market Release	17Jul2006	**Total Malfunctions (USA)**	**2**
CE Approval Date	20Sep2005	**Therapy Function Not Compromised**	**1**
Registered USA Implants	4,548	Electrical Component	1
Estimated Active USA Implants	1,302	**Therapy Function Compromised**	**1**
Normal Battery Depletions	601	Electrical Component	1



Years	1	2	3	4	5	6	7	8	9	10	11	12	13	at 165 mo
Excluding NBD	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Including NBD	99.9%	99.9%	99.8%	99.6%	99.3%	98.8%	97.9%	94.9%	87.4%	74.0%	60.0%	44.6%	30.4%	10.0%
Effective Sample Size	393188	365289	338762	312876	288852	264644	237966	204738	161786	112637	69401	34152	11220	215

ADDR06 Adapta DR

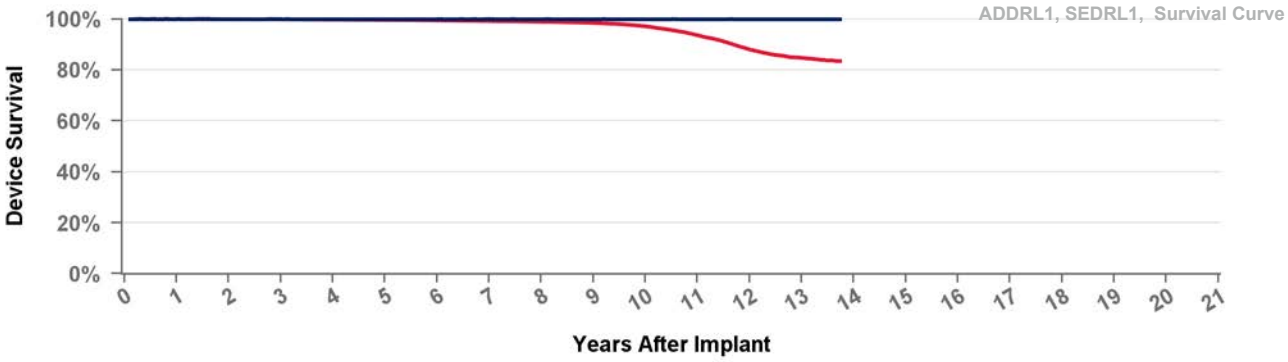
US Market Release	17Jul2006	**Total Malfunctions (USA)**	**1**
CE Approval Date	20Sep2005	**Therapy Function Not Compromised**	**1**
Registered USA Implants	3,624	Electrical Component	1
Estimated Active USA Implants	868	**Therapy Function Compromised**	**0**
Normal Battery Depletions	425		



Years	1	2	3	4	5	6	7	8	9	10	11	12	13	at 165 mo
Excluding NBD	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Including NBD	99.9%	99.9%	99.8%	99.6%	99.3%	98.8%	97.9%	94.9%	87.4%	74.0%	60.0%	44.6%	30.4%	10.0%
Effective Sample Size	393188	365289	338762	312876	288852	264644	237966	204738	161786	112637	69401	34152	11220	215

ADDRL1 Adapta L DR

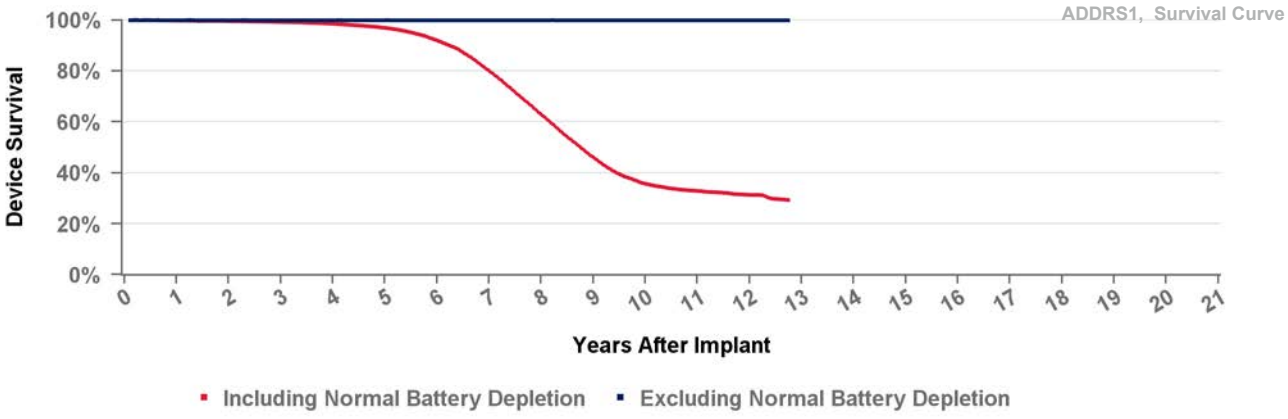
US Market Release	17Jul2006	**Total Malfunctions (USA)**	**24**
CE Approval Date	20Sep2005	**Therapy Function Not Compromised**	**17**
Registered USA Implants	138,603	Electrical Component	13
Estimated Active USA Implants	67,157	Electrical Interconnect	1
Normal Battery Depletions	2,870	Possible Early Battery Depletion	2
		Software/Firmware	1
		Therapy Function Compromised	**7**
		Electrical Component	4
		Electrical Interconnect	1
		Other	2



Years	1	2	3	4	5	6	7	8	9	10	11	12	13	at 165 mo
Excluding NBD	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Including NBD	100.0%	99.9%	99.9%	99.8%	99.7%	99.5%	99.2%	99.0%	98.5%	97.1%	93.6%	88.0%	84.8%	83.6%
Effective Sample Size	119781	112791	106132	99515	92196	84470	76032	65784	54529	42101	28866	16203	6218	529

ADDRS1 Adapta S DR

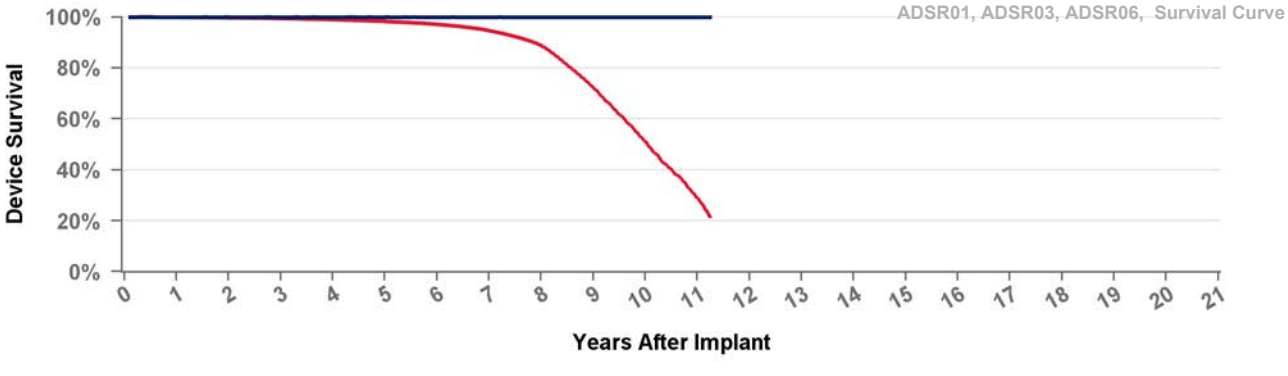
US Market Release	17Jul2006	**Total Malfunctions (USA)**	**15**
CE Approval Date	20Sep2005	**Therapy Function Not Compromised**	**9**
Registered USA Implants	49,302	Electrical Component	5
Estimated Active USA Implants	10,018	Possible Early Battery Depletion	3
Normal Battery Depletions	6,532	Other	1
		Therapy Function Compromised	**6**
		Electrical Component	4
		Other	2



Years	1	2	3	4	5	6	7	8	9	10	11	12	at 153 mo
Excluding NBD	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Including NBD	99.8%	99.6%	99.3%	98.6%	96.9%	92.0%	80.0%	62.8%	46.0%	35.7%	32.9%	31.4%	29.3%
Effective Sample Size	40113	36088	32360	28893	25473	21345	15845	10238	5874	3216	1853	841	156

ADSR01 Adapta SR

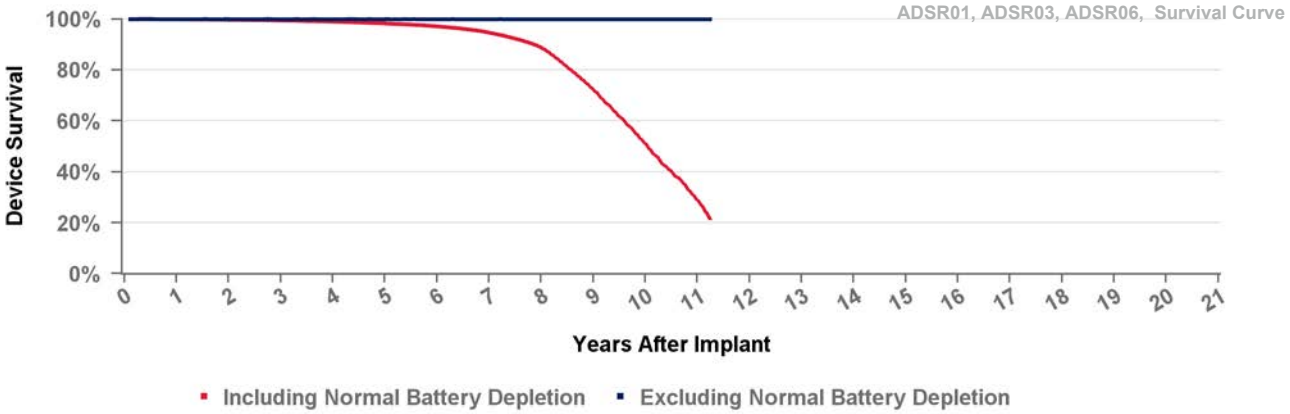
US Market Release	17Jul2006	**Total Malfunctions (USA)**	**18**
CE Approval Date	20Sep2005	**Therapy Function Not Compromised**	**12**
Registered USA Implants	91,661	Electrical Component	7
Estimated Active USA Implants	19,544	Electrical Interconnect	1
Normal Battery Depletions	6,231	Possible Early Battery Depletion	4
		Therapy Function Compromised	**6**
		Electrical Component	5
		Electrical Interconnect	1



Years	1	2	3	4	5	6	7	8	9	10	11	at 135 mo
Excluding NBD	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Including NBD	99.9%	99.7%	99.5%	99.0%	98.3%	97.1%	94.6%	88.7%	72.2%	51.2%	29.0%	21.5%
Effective Sample Size	72028	62944	55093	48012	41196	34864	28921	22170	13793	5968	1154	325

ADSR03 Adapta SR

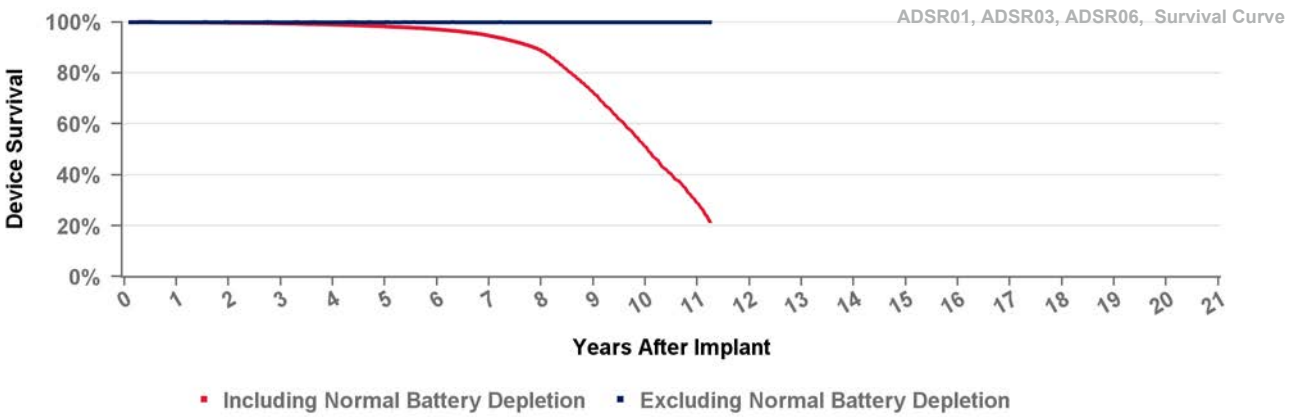
US Market Release	17Jul2006	**Total Malfunctions (USA)**	
CE Approval Date	20Sep2005	**Therapy Function Not Compromised**	
Registered USA Implants	2,119		
Estimated Active USA Implants	437	**Therapy Function Compromised**	
Normal Battery Depletions	198		



Years	1	2	3	4	5	6	7	8	9	10	11	at 135 mo
Excluding NBD	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Including NBD	99.9%	99.7%	99.5%	99.0%	98.3%	97.1%	94.6%	88.7%	72.2%	51.2%	29.0%	21.5%
Effective Sample Size	72028	62944	55093	48012	41196	34864	28921	22170	13793	5968	1154	325

ADSR06 Adapta SR

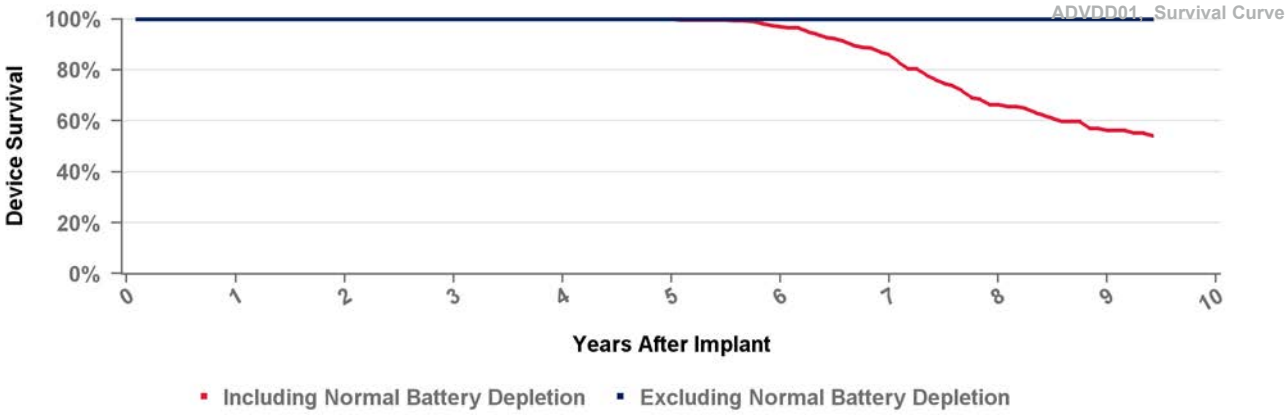
US Market Release	17Jul2006	**Total Malfunctions (USA)**	**2**
CE Approval Date	20Sep2005	**Therapy Function Not Compromised**	**2**
Registered USA Implants	2,901	Electrical Component	2
Estimated Active USA Implants	605	**Therapy Function Compromised**	**0**
Normal Battery Depletions	268		



Years	1	2	3	4	5	6	7	8	9	10	11	at 135 mo
Excluding NBD	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Including NBD	99.9%	99.7%	99.5%	99.0%	98.3%	97.1%	94.6%	88.7%	72.2%	51.2%	29.0%	21.5%
Effective Sample Size	72028	62944	55093	48012	41196	34864	28921	22170	13793	5968	1154	325

ADVDD01 Adapta VDD

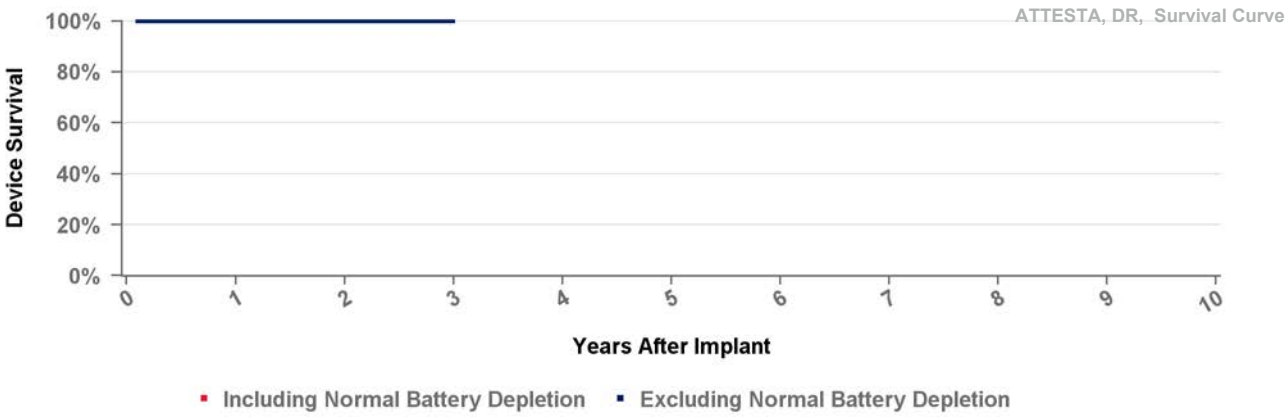
US Market Release	17Jul2006	**Total Malfunctions (USA)**	
CE Approval Date	20Sep2005	**Therapy Function Not Compromised**	
Registered USA Implants	856		
Estimated Active USA Implants	216	**Therapy Function Compromised**	
Normal Battery Depletions	95		



Years	1	2	3	4	5	6	7	8	9	at 113 mo
Excluding NBD	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Including NBD	100.0%	100.0%	100.0%	100.0%	100.0%	97.0%	85.9%	66.4%	56.2%	54.1%
Effective Sample Size	704	645	584	526	468	407	316	185	123	105

ATDR01 Attesta DR MRI

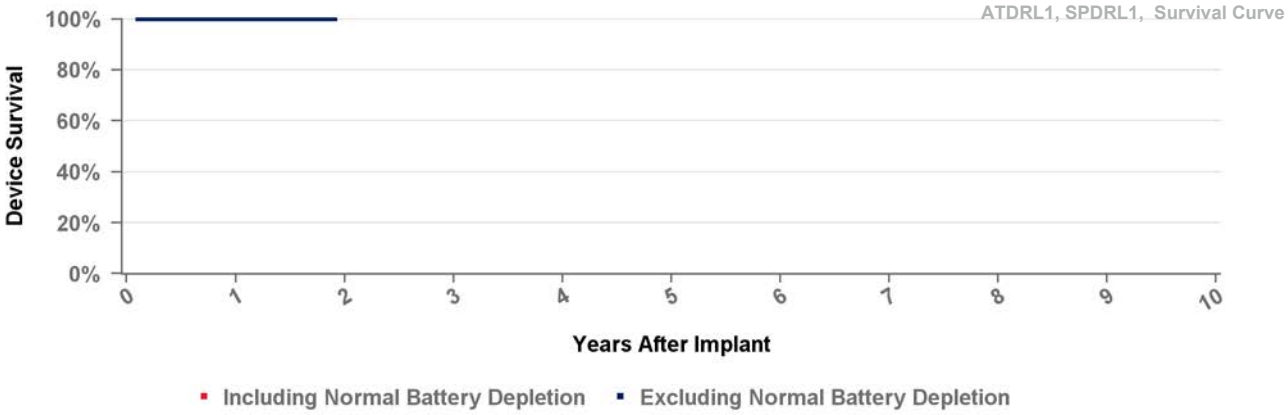
US Market Release	03Aug2017	**Total Malfunctions (USA)**	
CE Approval Date	16Jun2017	**Therapy Function Not Compromised**	
Registered USA Implants	1,898		
Estimated Active USA Implants	1,833	**Therapy Function Compromised**	
Normal Battery Depletions			



Years	1	2	at 36 mo
Excluding NBD	100.0%	100.0%	100.0%
Including NBD	100.0%	100.0%	100.0%
Effective Sample Size	1308	729	108

ATDRL1 Attesta L DR MRI

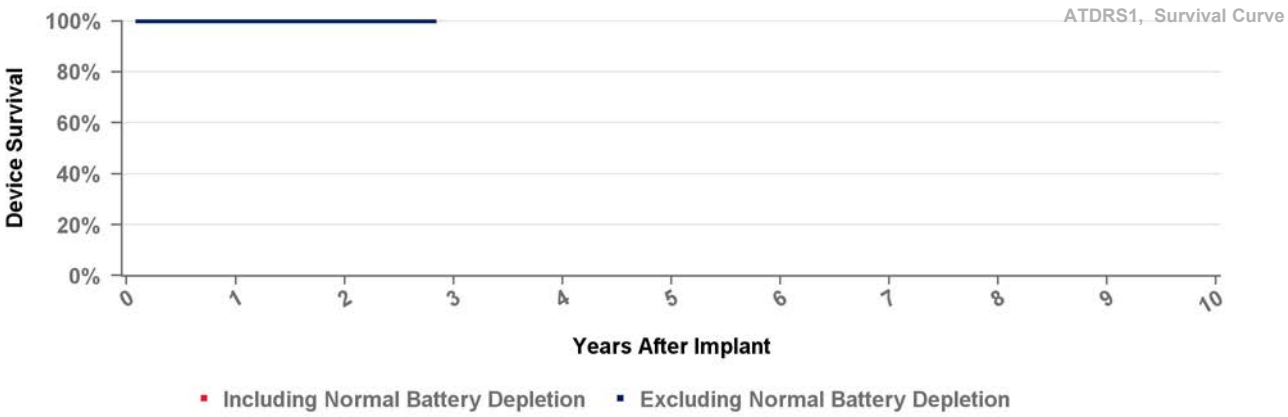
US Market Release	03Aug2017	**Total Malfunctions (USA)**	
CE Approval Date	16Jun2017	**Therapy Function Not Compromised**	
Registered USA Implants	273		
Estimated Active USA Implants	265	**Therapy Function Compromised**	
Normal Battery Depletions			



Years	1	at 23 mo
Excluding NBD	100.0%	100.0%
Including NBD	100.0%	100.0%
Effective Sample Size	192	106

ATDRS1 Attesta S DR MRI

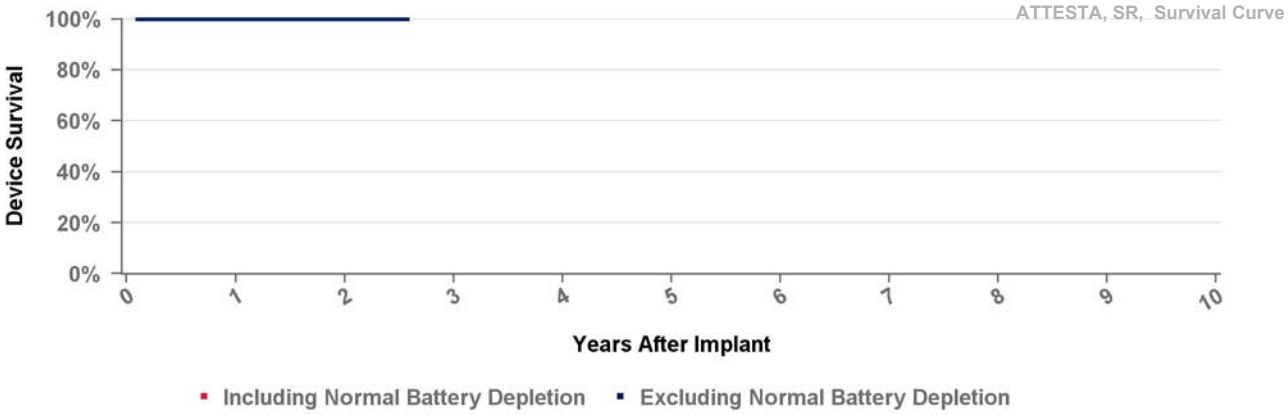
US Market Release	03Aug2017	**Total Malfunctions (USA)**	
CE Approval Date	16Jun2017	**Therapy Function Not Compromised**	
Registered USA Implants	1,180		
Estimated Active USA Implants	1,094	**Therapy Function Compromised**	
Normal Battery Depletions			



Years	1	2	at 34 mo
Excluding NBD	100.0%	100.0%	100.0%
Including NBD	100.0%	100.0%	100.0%
Effective Sample Size	804	385	108

ATSR01 Attesta SR MRI

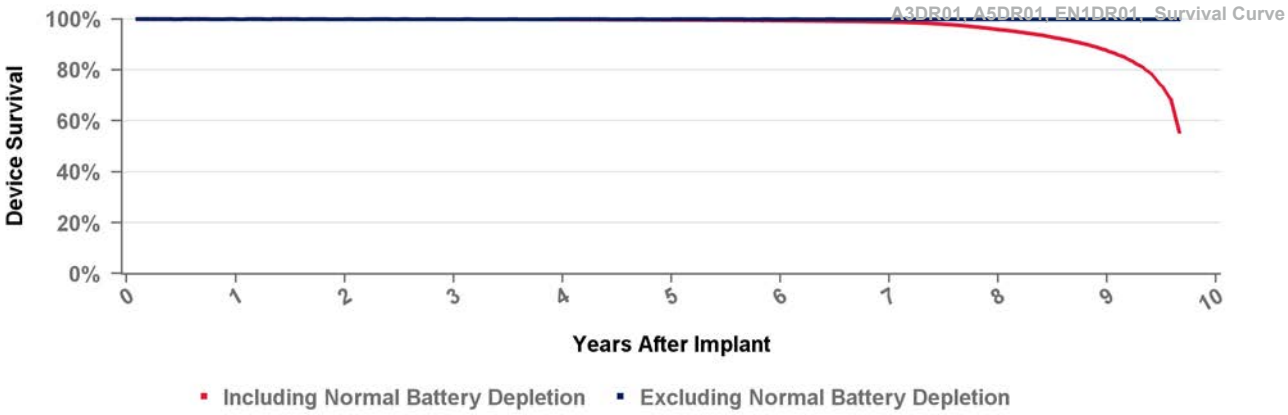
US Market Release	03Aug2017	**Total Malfunctions (USA)**	
CE Approval Date	16Jun2017	**Therapy Function Not Compromised**	
Registered USA Implants	1,011		
Estimated Active USA Implants	782	**Therapy Function Compromised**	
Normal Battery Depletions			



Years	1	2	at 31 mo
Excluding NBD	100.0%	100.0%	100.0%
Including NBD	100.0%	100.0%	100.0%
Effective Sample Size	531	268	111

EN1DR01 Ensura MRI

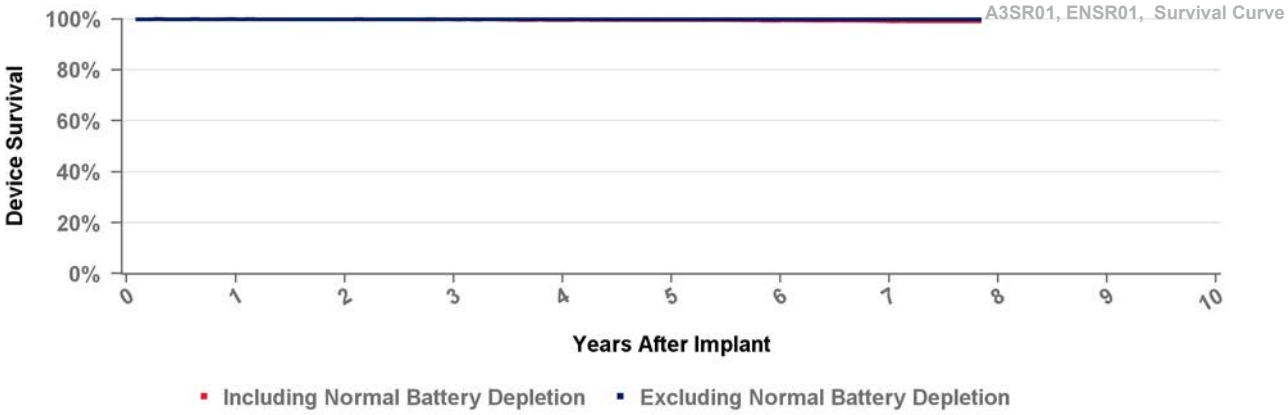
US Market Release		**Total Malfunctions (USA)**	
CE Approval Date	23Jun2010	**Therapy Function Not Compromised**	
Registered USA Implants	5		
Estimated Active USA Implants	2	**Therapy Function Compromised**	
Normal Battery Depletions			



Years	1	2	3	4	5	6	7	8	9	at 116 mo
Excluding NBD	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Including NBD	100.0%	99.9%	99.9%	99.8%	99.7%	99.4%	98.9%	95.9%	87.6%	55.5%
Effective Sample Size	308538	290678	273742	256730	237337	215434	151447	83731	27980	1468

EN1SR01 Ensura SR MRI

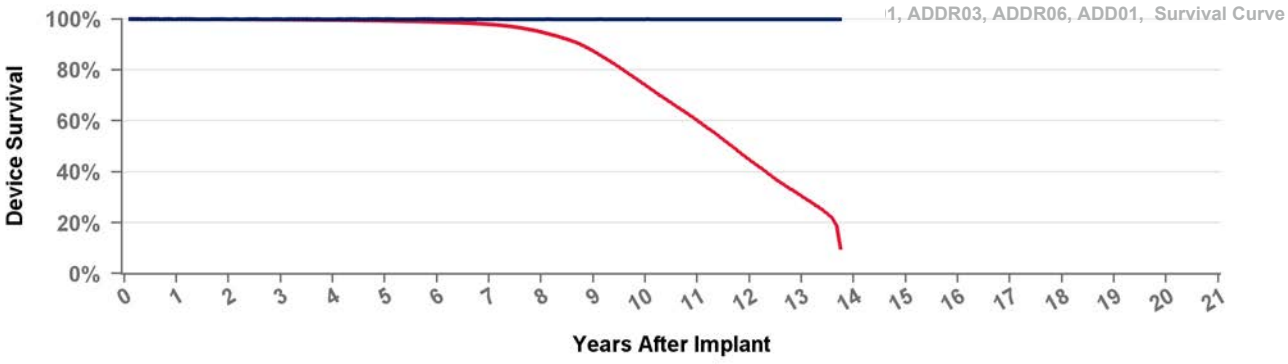
US Market Release		**Total Malfunctions (USA)**	
CE Approval Date	24Apr2014	**Therapy Function Not Compromised**	
Registered USA Implants			
Estimated Active USA Implants		**Therapy Function Compromised**	
Normal Battery Depletions			



Years	1	2	3	4	5	6	7	at 94 mo
Excluding NBD	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Including NBD	99.9%	99.9%	99.8%	99.7%	99.6%	99.5%	99.2%	99.1%
Effective Sample Size	22041	19395	17206	15023	12900	10832	5150	267

RED01 Relia D

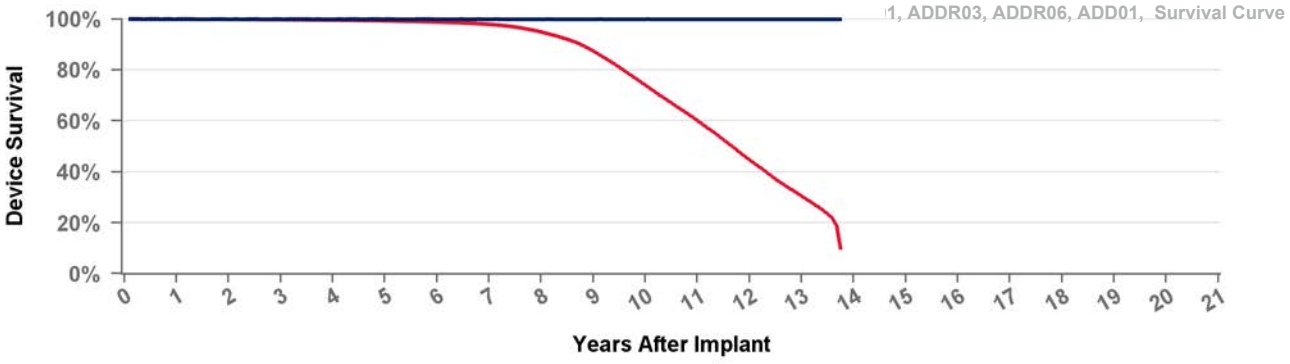
US Market Release		**Total Malfunctions (USA)**	
CE Approval Date	07May2008	**Therapy Function Not Compromised**	
Registered USA Implants	2		
Estimated Active USA Implants		**Therapy Function Compromised**	
Normal Battery Depletions	1		



Years	1	2	3	4	5	6	7	8	9	10	11	12	13	at 165 mo
Excluding NBD	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Including NBD	99.9%	99.9%	99.8%	99.6%	99.3%	98.8%	97.9%	94.9%	87.4%	74.0%	60.0%	44.6%	30.4%	10.0%
Effective Sample Size	393188	365289	338762	312876	288852	264644	237966	204738	161786	112637	69401	34152	11220	215

REDR01 Relia DR

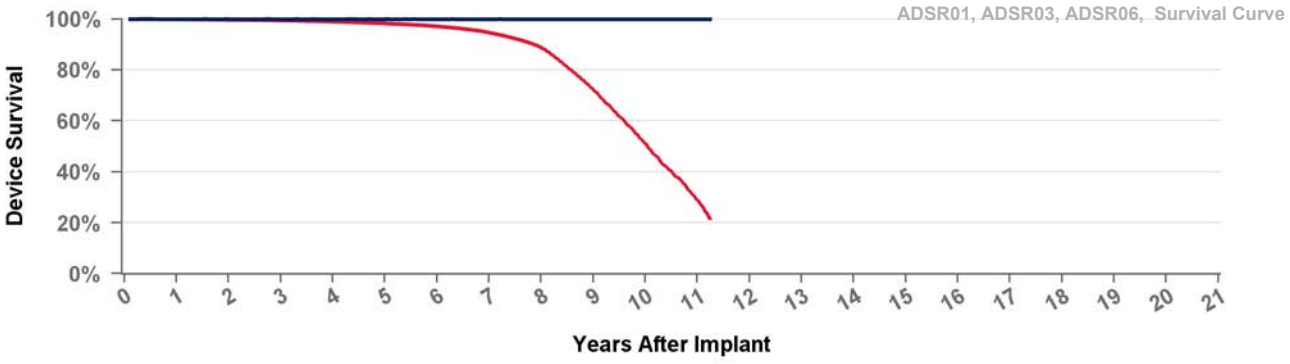
US Market Release		**Total Malfunctions (USA)**	
CE Approval Date	07May2008	**Therapy Function Not Compromised**	
Registered USA Implants	8		
Estimated Active USA Implants	2	**Therapy Function Compromised**	
Normal Battery Depletions	1		



Years	1	2	3	4	5	6	7	8	9	10	11	12	13	at 165 mo
Excluding NBD	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Including NBD	99.9%	99.9%	99.8%	99.6%	99.3%	98.8%	97.9%	94.9%	87.4%	74.0%	60.0%	44.6%	30.4%	10.0%
Effective Sample Size	393188	365289	338762	312876	288852	264644	237966	204738	161786	112637	69401	34152	11220	215

RES01 Relia S

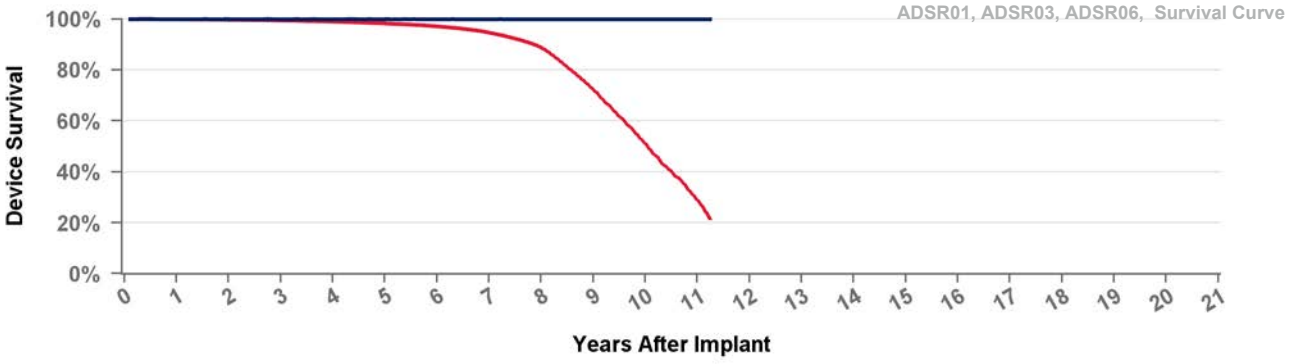
US Market Release		**Total Malfunctions (USA)**	
CE Approval Date	07May2008	**Therapy Function Not Compromised**	
Registered USA Implants	3		
Estimated Active USA Implants	1	**Therapy Function Compromised**	
Normal Battery Depletions			



Years	1	2	3	4	5	6	7	8	9	10	11	at 135 mo
Excluding NBD	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Including NBD	99.9%	99.7%	99.5%	99.0%	98.3%	97.1%	94.6%	88.7%	72.2%	51.2%	29.0%	21.5%
Effective Sample Size	72028	62944	55093	48012	41196	34864	28921	22170	13793	5968	1154	325

RESR01 Relia SR

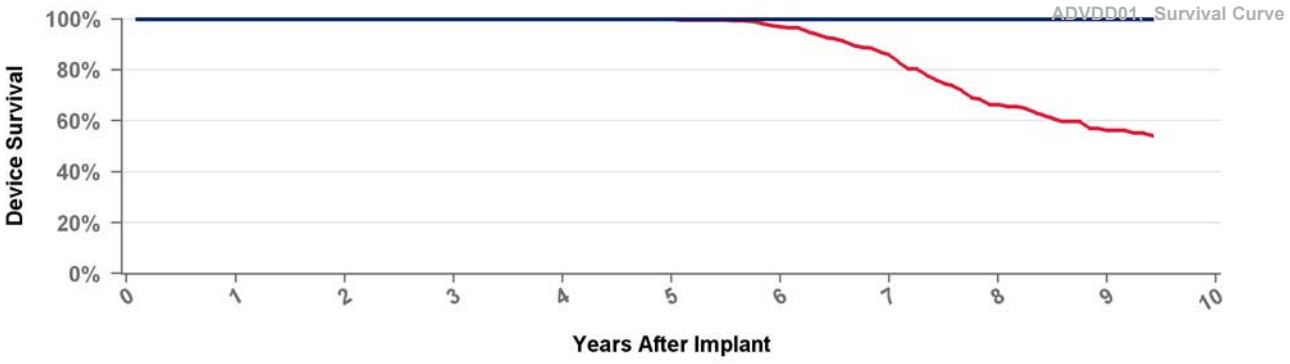
US Market Release		**Total Malfunctions (USA)**	
CE Approval Date	07May2008	**Therapy Function Not Compromised**	
Registered USA Implants	6		
Estimated Active USA Implants		**Therapy Function Compromised**	
Normal Battery Depletions			



Years	1	2	3	4	5	6	7	8	9	10	11	at 135 mo
Excluding NBD	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Including NBD	99.9%	99.7%	99.5%	99.0%	98.3%	97.1%	94.6%	88.7%	72.2%	51.2%	29.0%	21.5%
Effective Sample Size	72028	62944	55093	48012	41196	34864	28921	22170	13793	5968	1154	325

REVDD01 Relia VDD

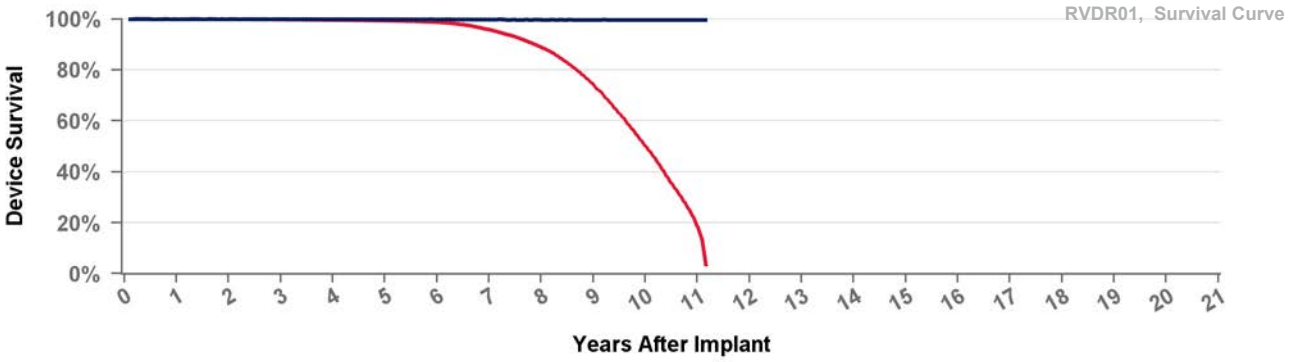
US Market Release		**Total Malfunctions (USA)**	
CE Approval Date	07May2008	**Therapy Function Not Compromised**	
Registered USA Implants	1		
Estimated Active USA Implants		**Therapy Function Compromised**	
Normal Battery Depletions			



Years	1	2	3	4	5	6	7	8	9	at 113 mo
Excluding NBD	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Including NBD	100.0%	100.0%	100.0%	100.0%	100.0%	97.0%	85.9%	66.4%	56.2%	54.1%
Effective Sample Size	704	645	584	526	468	407	316	185	123	105

RVDR01 Revo MRI SureScan

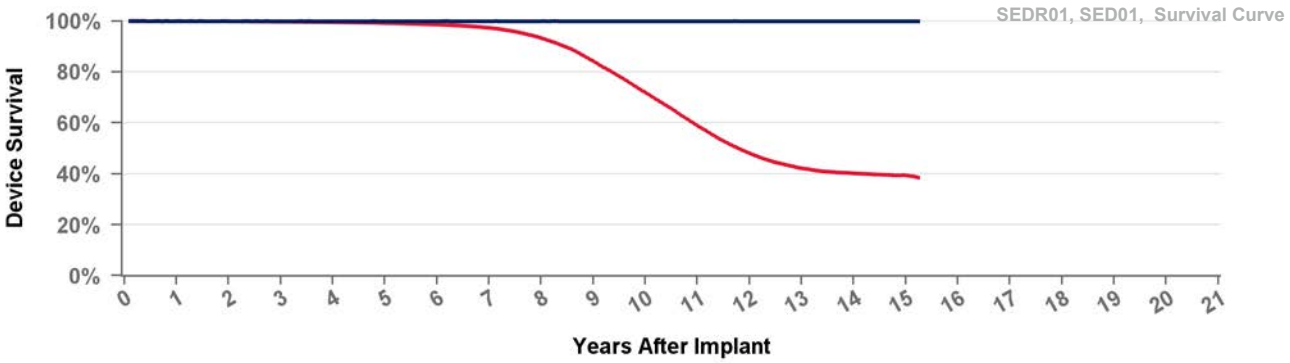
US Market Release	08Feb2011	**Total Malfunctions (USA)**	**111**
CE Approval Date		**Therapy Function Not Compromised**	**108**
Registered USA Implants	69,111	Battery	1
Estimated Active USA Implants	15,209	Electrical Component	40
Normal Battery Depletions	11,362	Electrical Interconnect	1
		Possible Early Battery Depletion	61
		Software/Firmware	4
		Other	1
		Therapy Function Compromised	**3**
		Electrical Component	3



Years	1	2	3	4	5	6	7	8	9	10	11	at 134 mo
Excluding NBD	100.0%	100.0%	99.9%	99.9%	99.9%	99.8%	99.8%	99.8%	99.7%	99.7%	99.7%	99.7%
Including NBD	100.0%	99.9%	99.8%	99.6%	99.4%	98.8%	95.8%	88.9%	74.2%	50.3%	18.7%	3.3%
Effective Sample Size	59300	56140	53125	49960	46263	42247	37412	31193	22143	11643	2011	324

SED01 Sensia D

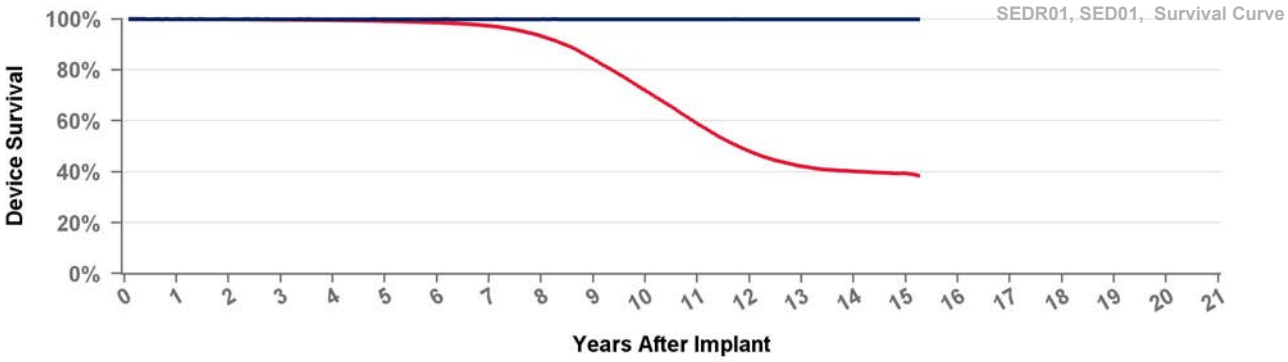
US Market Release	17Jul2006	**Total Malfunctions (USA)**	
CE Approval Date	20Sep2005	**Therapy Function Not Compromised**	
Registered USA Implants	5		
Estimated Active USA Implants	1	**Therapy Function Compromised**	
Normal Battery Depletions	1		



Years	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	at 183 mo
Excluding NBD	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Including NBD	99.9%	99.9%	99.8%	99.6%	99.2%	98.6%	97.3%	93.3%	84.2%	71.9%	58.8%	48.0%	42.2%	40.2%	39.4%	38.4%
Effective Sample Size	120540	109011	98359	88724	79995	72199	64954	56070	43257	30773	20002	12019	6956	3544	833	220

SEDR01 Sensia DR

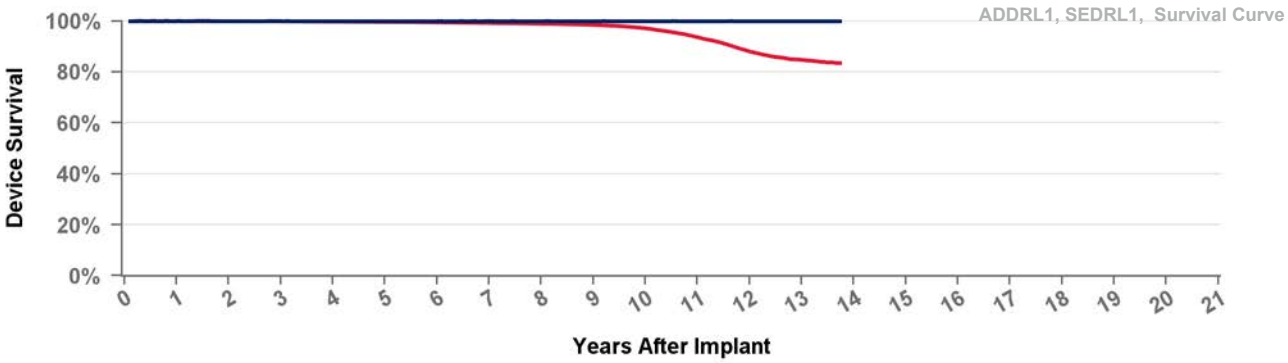
US Market Release	17Jul2006	**Total Malfunctions (USA)**	**33**
CE Approval Date	20Sep2005	**Therapy Function Not Compromised**	**17**
Registered USA Implants	149,402	Electrical Component	15
Estimated Active USA Implants	30,095	Electrical Interconnect	1
Normal Battery Depletions	16,131	Other	1
		Therapy Function Compromised	**16**
		Electrical Component	6
		Electrical Interconnect	3
		Possible Early Battery Depletion	1
		Other	6



Years	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	at 183 mo
Excluding NBD	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Including NBD	99.9%	99.9%	99.8%	99.6%	99.2%	98.6%	97.3%	93.3%	84.2%	71.9%	58.8%	48.0%	42.2%	40.2%	39.4%	38.4%
Effective Sample Size	120540	109011	98359	88724	79995	72199	64954	56070	43257	30773	20002	12019	6956	3544	833	220

SEDRL1 Sensia L DR

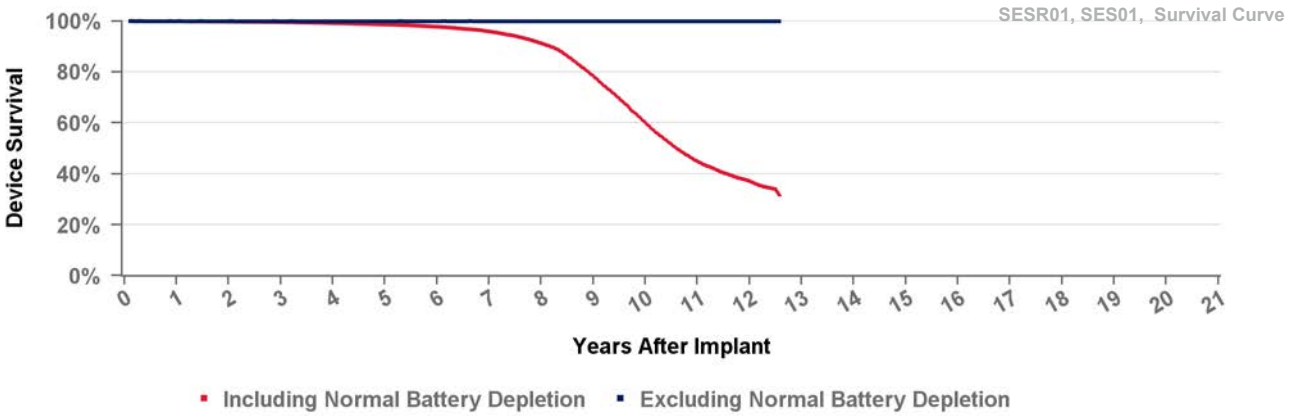
US Market Release	17Jul2006	**Total Malfunctions (USA)**	
CE Approval Date	20Sep2005	**Therapy Function Not Compromised**	
Registered USA Implants	5		
Estimated Active USA Implants	1	**Therapy Function Compromised**	
Normal Battery Depletions			



Years	1	2	3	4	5	6	7	8	9	10	11	12	13	at 165 mo
Excluding NBD	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Including NBD	100.0%	99.9%	99.9%	99.8%	99.7%	99.5%	99.2%	99.0%	98.5%	97.1%	93.6%	88.0%	84.8%	83.6%
Effective Sample Size	119781	112791	106132	99515	92196	84470	76032	65784	54529	42101	28866	16203	6218	529

SES01 Sensia S

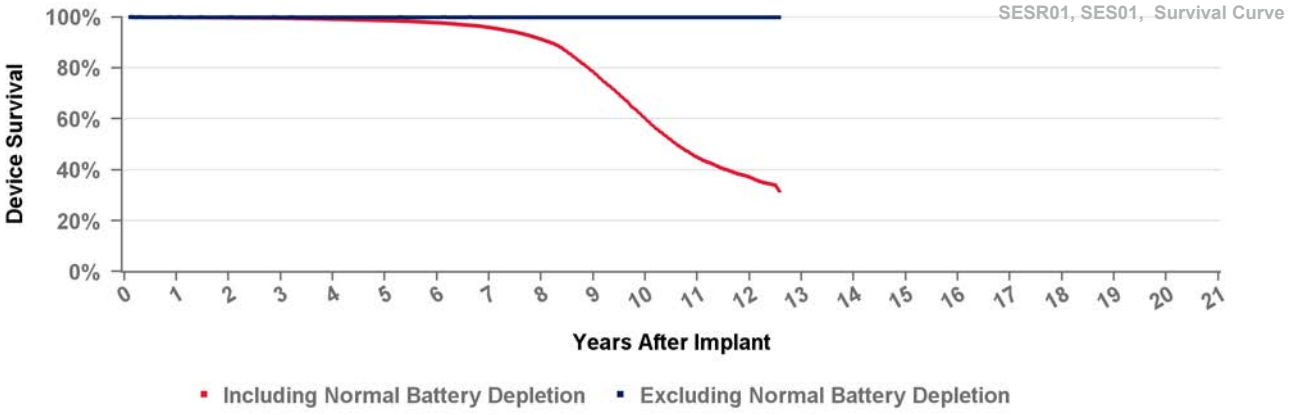
US Market Release	17Jul2006	**Total Malfunctions (USA)**	
CE Approval Date	20Sep2005	**Therapy Function Not Compromised**	
Registered USA Implants	4		
Estimated Active USA Implants	1	**Therapy Function Compromised**	
Normal Battery Depletions			



Years	1	2	3	4	5	6	7	8	9	10	11	12	at 151 mo
Excluding NBD	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Including NBD	99.9%	99.8%	99.6%	99.2%	98.7%	97.8%	95.9%	91.2%	78.3%	60.0%	44.9%	37.2%	31.6%
Effective Sample Size	85830	74457	64552	56011	48248	41084	34582	27602	18942	10422	4700	1561	151

SESR01 Sensia SR

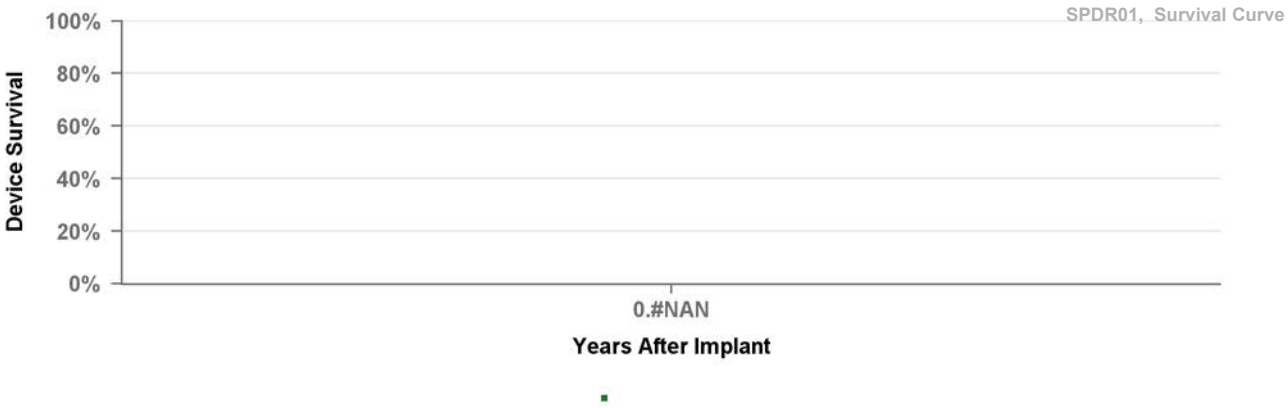
US Market Release	17Jul2006	**Total Malfunctions (USA)**	**17**
CE Approval Date	20Sep2005	**Therapy Function Not Compromised**	**13**
Registered USA Implants	117,372	Electrical Component	7
Estimated Active USA Implants	22,056	Possible Early Battery Depletion	4
Normal Battery Depletions	8,574	Other	2
		Therapy Function Compromised	**4**
		Electrical Component	3
		Electrical Interconnect	1



Years	1	2	3	4	5	6	7	8	9	10	11	12	at 151 mo
Excluding NBD	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Including NBD	99.9%	99.8%	99.6%	99.2%	98.7%	97.8%	95.9%	91.2%	78.3%	60.0%	44.9%	37.2%	31.6%
Effective Sample Size	85830	74457	64552	56011	48248	41084	34582	27602	18942	10422	4700	1561	151

SPDR01 Sphera DR MRI

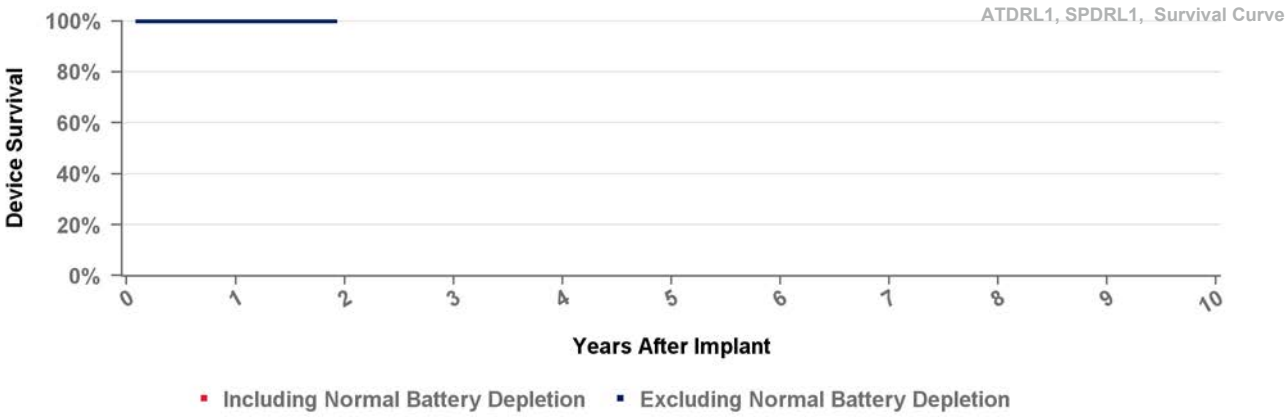
US Market Release	03Aug2017	**Total Malfunctions (USA)**
CE Approval Date	16Jun2017	**Therapy Function Not Compromised**
Registered USA Implants		
Estimated Active USA Implants		**Therapy Function Compromised**
Normal Battery Depletions		



Years	
Excluding NBD	
Including NBD	
Effective Sample Size	

SPDRL1 Sphera L DR MRI

US Market Release	03Aug2017	**Total Malfunctions (USA)**
CE Approval Date	16Jun2017	**Therapy Function Not Compromised**
Registered USA Implants	1	
Estimated Active USA Implants		**Therapy Function Compromised**
Normal Battery Depletions		



Years	1	at 23 mo
Excluding NBD	100.0%	100.0%
Including NBD	100.0%	100.0%
Effective Sample Size	192	106

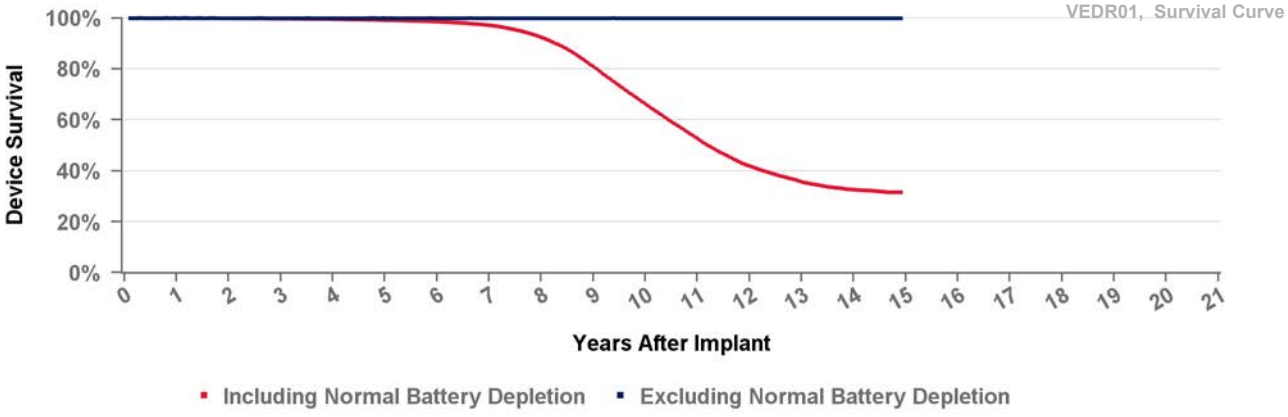
SPSR01 Sphera SR MRI

US Market Release	03Aug2017	**Total Malfunctions (USA)**	
CE Approval Date	16Jun2017	**Therapy Function Not Compromised**	
Registered USA Implants	1		
Estimated Active USA Implants	1	**Therapy Function Compromised**	
Normal Battery Depletions			

Years	
Excluding NBD	
Including NBD	
Effective Sample Size	

VEDR01 Versa DR

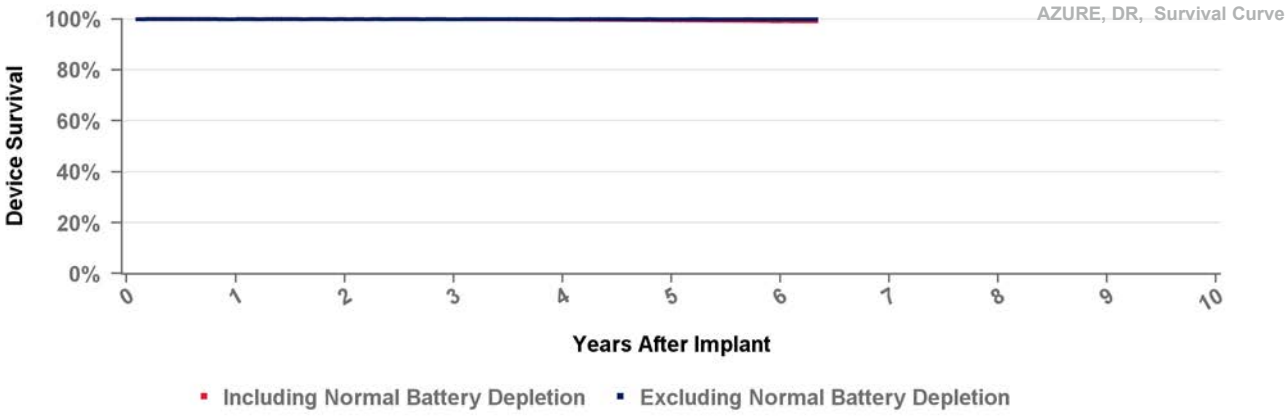
US Market Release	17Jul2006	**Total Malfunctions (USA)**	**25**
CE Approval Date	20Sep2005	**Therapy Function Not Compromised**	**11**
Registered USA Implants	118,955	Electrical Component	7
Estimated Active USA Implants	24,936	Electrical Interconnect	2
Normal Battery Depletions	14,225	Possible Early Battery Depletion	2
		Therapy Function Compromised	**14**
		Electrical Component	10
		Other	4



Years	1	2	3	4	5	6	7	8	9	10	11	12	13	14	at 179 mo
Excluding NBD	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Including NBD	99.9%	99.9%	99.8%	99.6%	99.2%	98.6%	97.2%	92.4%	80.9%	66.3%	52.6%	41.9%	35.6%	32.7%	31.6%
Effective Sample Size	98668	90172	82080	74698	67993	61725	54264	44905	33479	22812	14382	8335	4499	1895	163

W1DR01 Azure XT DR

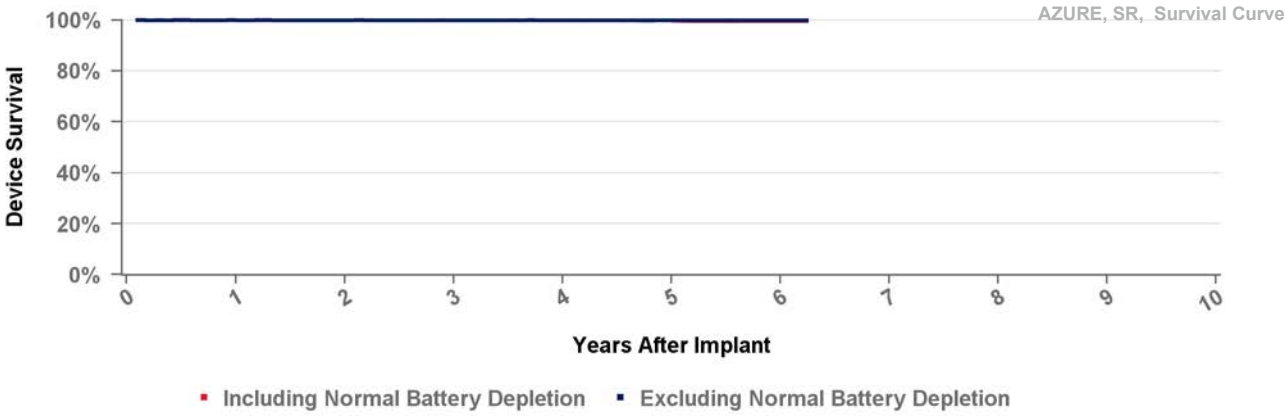
US Market Release	16Aug2017	**Total Malfunctions (USA)**	**137**
CE Approval Date	02Mar2017	**Therapy Function Not Compromised**	**124**
Registered USA Implants	679,717	Battery	3
Estimated Active USA Implants	611,942	Electrical Component	76
Normal Battery Depletions	437	Possible Early Battery Depletion	3
		Software/Firmware	21
		Other	21
		Therapy Function Compromised	**13**
		Battery	2
		Electrical Component	11



Years	1	2	3	4	5	6	at 76 mo
Excluding NBD	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Including NBD	100.0%	100.0%	99.9%	99.8%	99.5%	99.2%	99.2%
Effective Sample Size	546679	400761	275773	172250	82477	10614	151

W1SR01 Azure XT SR

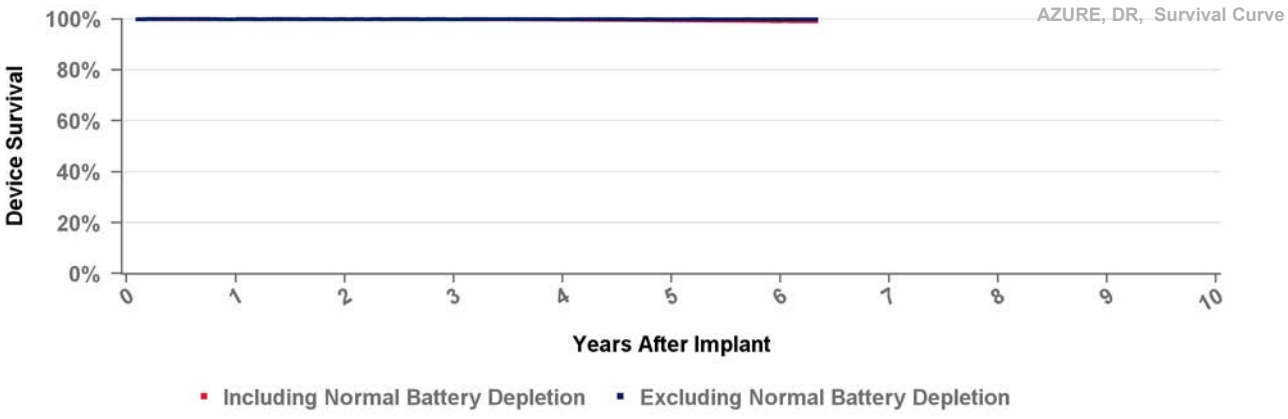
US Market Release	16Aug2017	**Total Malfunctions (USA)**	**10**
CE Approval Date	02Mar2017	**Therapy Function Not Compromised**	**9**
Registered USA Implants	53,972	Battery	1
Estimated Active USA Implants	44,646	Electrical Component	5
Normal Battery Depletions	20	Software/Firmware	1
		Other	2
		Therapy Function Compromised	**1**
		Electrical Component	1



Years	1	2	3	4	5	6	at 75 mo
Excluding NBD	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Including NBD	100.0%	100.0%	99.9%	99.9%	99.8%	99.5%	99.5%
Effective Sample Size	47639	34840	24079	14528	6582	807	104

W2DR01 Azure XT DR

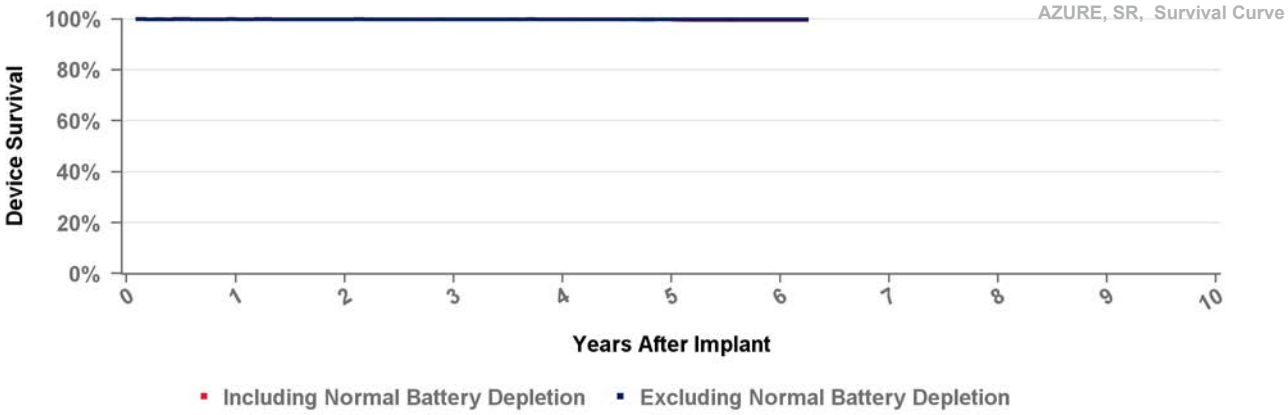
US Market Release		**Total Malfunctions (USA)**	
CE Approval Date	02Mar2017	**Therapy Function Not Compromised**	
Registered USA Implants	2		
Estimated Active USA Implants	2	**Therapy Function Compromised**	
Normal Battery Depletions			



Years	1	2	3	4	5	6	at 76 mo
Excluding NBD	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Including NBD	100.0%	100.0%	99.9%	99.8%	99.5%	99.2%	99.2%
Effective Sample Size	546679	400761	275773	172250	82477	10614	151

W2SR01 Azure XT SR

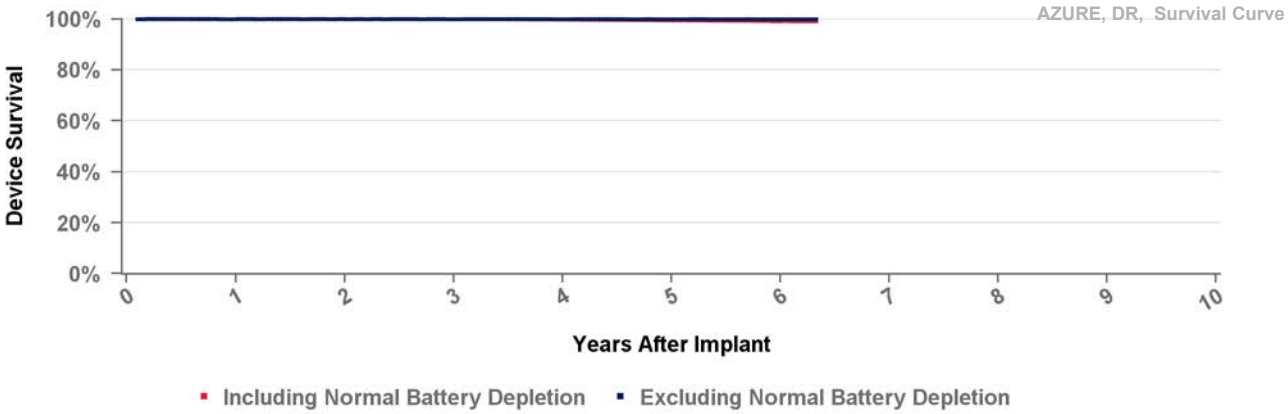
US Market Release		**Total Malfunctions (USA)**	
CE Approval Date	02Mar2017	**Therapy Function Not Compromised**	
Registered USA Implants			
Estimated Active USA Implants		**Therapy Function Compromised**	
Normal Battery Depletions			



Years	1	2	3	4	5	6	at 75 mo
Excluding NBD	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Including NBD	100.0%	100.0%	99.9%	99.9%	99.8%	99.5%	99.5%
Effective Sample Size	47639	34840	24079	14528	6582	807	104

W3DR01 Azure S DR

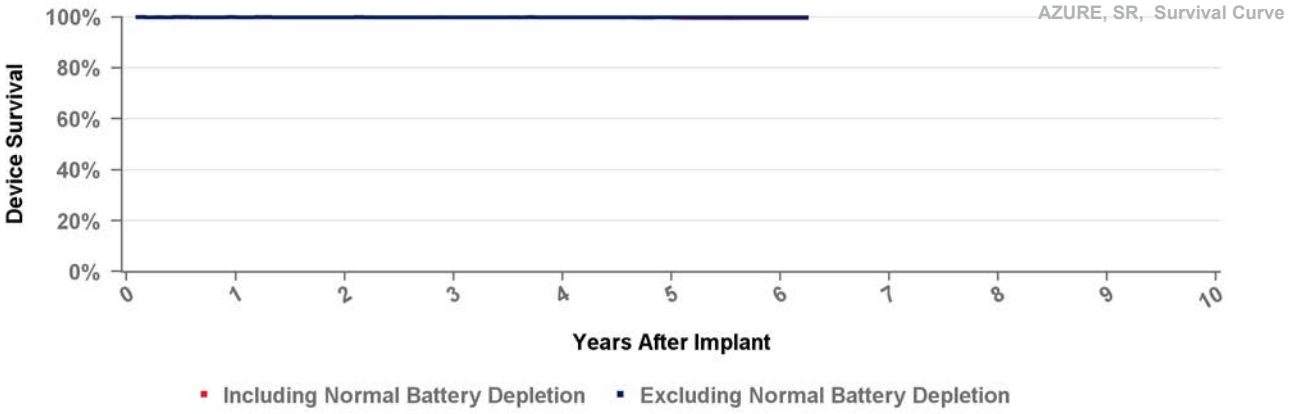
US Market Release	16Aug2017	**Total Malfunctions (USA)**	**11**
CE Approval Date	02Mar2017	**Therapy Function Not Compromised**	**10**
Registered USA Implants	61,119	Electrical Component	8
Estimated Active USA Implants	53,889	Software/Firmware	2
Normal Battery Depletions	89	**Therapy Function Compromised**	**1**
		Electrical Component	1



Years	1	2	3	4	5	6	at 76 mo
Excluding NBD	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Including NBD	100.0%	100.0%	99.9%	99.8%	99.5%	99.2%	99.2%
Effective Sample Size	546679	400761	275773	172250	82477	10614	151

W3SR01 Azure S SR

US Market Release	16Aug2017	**Total Malfunctions (USA)**	**1**
CE Approval Date	02Mar2017	**Therapy Function Not Compromised**	**1**
Registered USA Implants	12,294	Electrical Component	1
Estimated Active USA Implants	10,187	**Therapy Function Compromised**	**0**
Normal Battery Depletions			



Years	1	2	3	4	5	6	at 75 mo
Excluding NBD	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Including NBD	100.0%	100.0%	99.9%	99.9%	99.8%	99.5%	99.5%
Effective Sample Size	47639	34840	24079	14528	6582	807	104

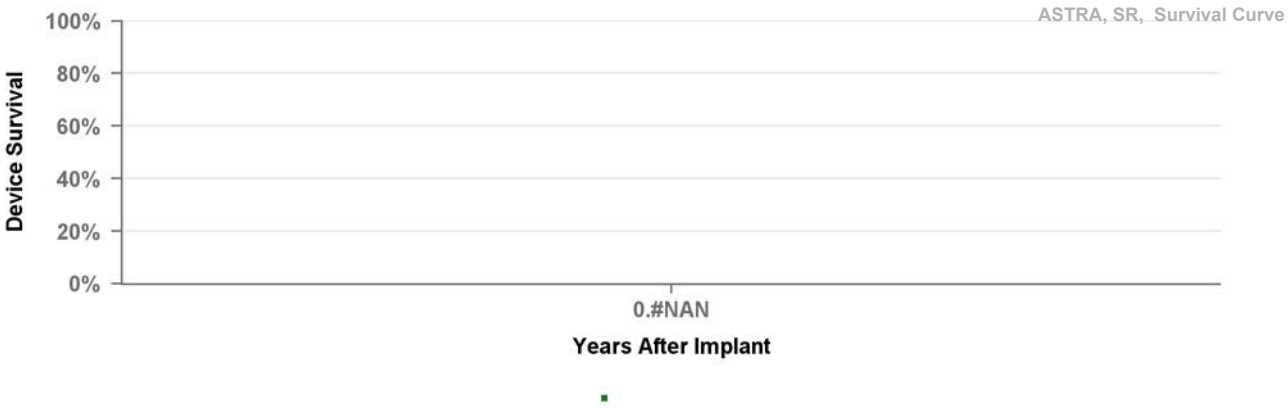
X2DR01 Astra XT DR MRI SureScan

US Market Release		**Total Malfunctions (USA)**	
CE Approval Date	02Mar2017	**Therapy Function Not Compromised**	
Registered USA Implants	1		
Estimated Active USA Implants		**Therapy Function Compromised**	
Normal Battery Depletions			

Years	
Excluding NBD	
Including NBD	
Effective Sample Size	

X2SR01 Astra XT SR MRI SureScan

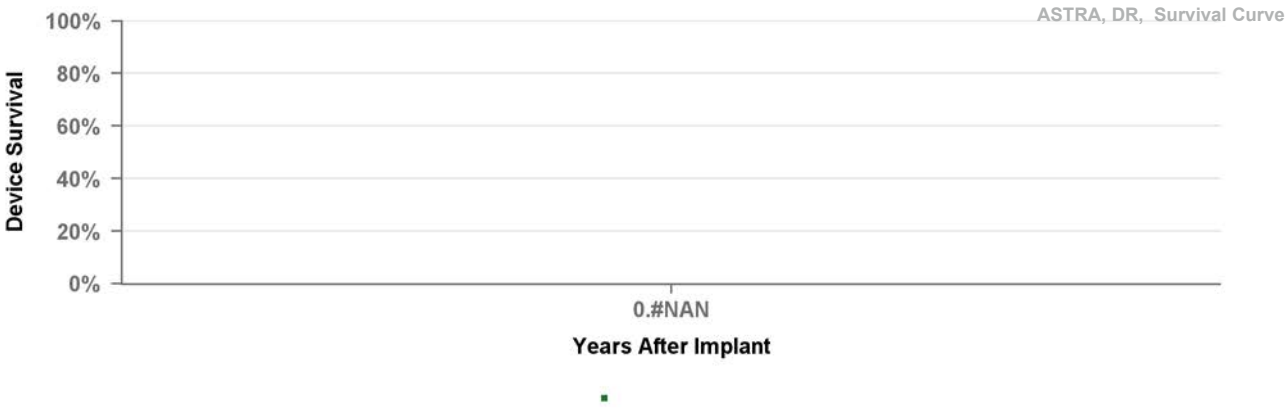
US Market Release		**Total Malfunctions (USA)**	
CE Approval Date	02Mar2017	**Therapy Function Not Compromised**	
Registered USA Implants			
Estimated Active USA Implants		**Therapy Function Compromised**	
Normal Battery Depletions			



Years	
Excluding NBD	
Including NBD	
Effective Sample Size	

X3DR01 Astra S DR

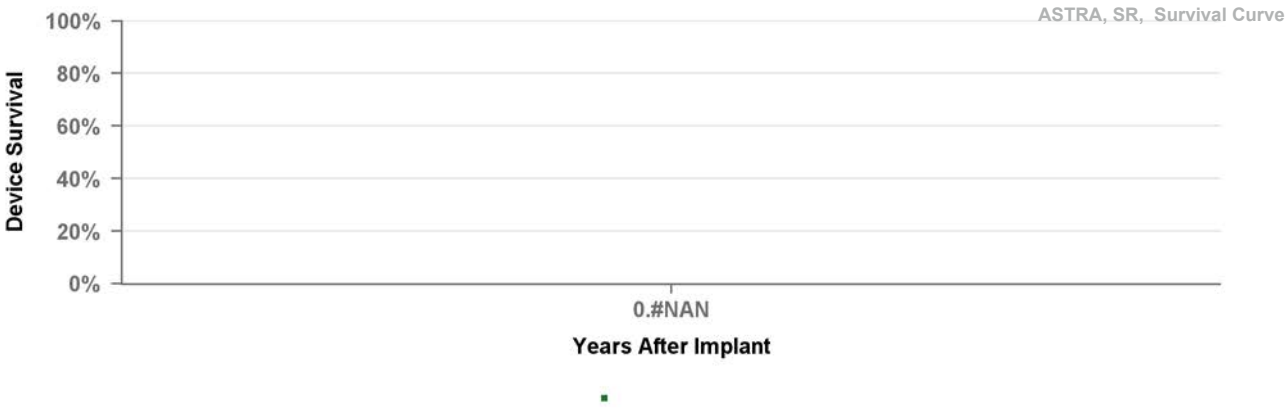
US Market Release		**Total Malfunctions (USA)**	
CE Approval Date	02Mar2017	**Therapy Function Not Compromised**	
Registered USA Implants			
Estimated Active USA Implants		**Therapy Function Compromised**	
Normal Battery Depletions			



Years	
Excluding NBD	
Including NBD	
Effective Sample Size	

X3SR01 Astra S SR

US Market Release		**Total Malfunctions (USA)**	
CE Approval Date	02Mar2017	**Therapy Function Not Compromised**	
Registered USA Implants			
Estimated Active USA Implants		**Therapy Function Compromised**	
Normal Battery Depletions			



Years	
Excluding NBD	
Including NBD	
Effective Sample Size	

Method for Estimating Transcatheter Pacing Performance

Micra TPS Performance Analysis

Transcatheter pacing systems (TPS) combine the pacing functions of an IPG with the therapy delivery functions of an implantable lead into a single device implanted inside the heart. Therefore, TPS is subject to complications similar to pacing leads (e.g. cardiac perforation) and malfunctions or battery depletion events similar to an implanted pulse generator (IPG). Although both transvenous systems and Micra IPG experience similar system level major complications, Micra has been shown to reduce the likelihood of major complications at a system level in post-approval registry data.

The performance report information is determined from the analysis of Medtronic Cardiac Rhythm Management (CRM) United States registration, complaint and CareLink™ network data. A TPS model or model family will be included in this report when it has accumulated at least 10,000 implant months and will remain in the report as long as at least 500 devices remain active in the CareLink™ population.

Shortfalls of using returned products to Estimate Micra TPS Performance

Micra TPS devices returned to Medtronic are analyzed to determine whether or not they meet performance limits established by Medtronic. Although returned product analyses are valuable for gaining insight into failure mechanisms, this data cannot be used by itself for determining the survival probability because only a small fraction of Micra devices are explanted and returned to Medtronic for analysis. Some devices are programmed off due to an adverse event, however, they are often not retrieved/ explanted. The devices that are retrieved and returned cannot be assumed to be statistically representative of the performance of the total population for a given model. For this same reason, devices that meet their expected longevity are also not expected to be returned to Medtronic CRM.

The CareLink™ Network

To account for the shortfalls of returned product analysis, a study of de-identified product data on the Medtronic CareLink™ network is used. The number of devices enrolled and transmitting actively enables a population large enough to give a representative volume of normal battery depletions and to provide insight into the complications that may occur after the device was successfully implanted. As the intent of the product performance report is to provide visibility to long-term device performance, the devices reviewed from the CareLink™ Network have been implanted for at least 30 days.

Categorization of Micra TPS Qualifying Complications or Malfunctions for Survival Analysis on CareLink™

For survival estimation, complication and premature battery depletion data from Medtronic's Complaint Handling System is adjudicated and subsequently cross-referenced with an assessment of device performance from the Medtronic CareLink™ network to categorize if the device is 1) functioning normally, 2) has reached normal battery depletion, or 3) has experienced a qualifying malfunction or complication. This categorization is combined with the CareLink™ data for the total number of implants and implant durations to create survival estimates for the likelihood of experiencing a qualifying complication or malfunction, and normal battery depletion. Ultimately, the data is summarized in two survival curves, one with only qualifying complications or malfunctions and the other including normal battery depletion.

Definition of Qualifying Complication or Malfunction

A longevity analysis is completed for all de-identified devices followed on CareLink™ that have reached the Recommended Replacement Time (RRT), to identify devices that experienced possible early battery depletion. These are findings where the actual reported implant time is less than 80% of the expected longevity calculated using the available device diagnostic information.

Methods for Estimating Transcatheter Pacing Performance continued

Additionally, all reported Micra TPS complaints are adjudicated by subject matter experts and medical safety personnel for inclusion as a product performance event given available information. These product performance events are then cross-referenced with the CareLink™ population for inclusion in the survival analysis.

Product Performance events include, but are not limited to, these that occur 30 days after the implant procedure:

- Premature Battery Depletion
- Cardiac Perforation
- Dislodgement
- Failure to Capture
- Elevated Pacing Threshold

Normal Battery Depletion

A longevity analysis is completed for all devices followed on CareLink™ that are at or within 6 months of RRT to identify devices were taken out of service due to normal battery depletion. The population that is within six months of RRT is assessed against the expected longevity of the product. Normal Battery Depletion is defined as the condition when the device has reached its elective replacement indicator(s) with implant time exceeding 80% of the expected longevity calculated using the available device diagnostic information.

Medtronic CRM establishes expected longevity by statistically characterizing the power consumed by the device and the power available from the device battery. This characterization is applied to a number of parameter configurations. The statistical mean value minus three standard deviations is used as the expected longevity for determining if a battery depleted normally. The actual longevity achieved for any device while implanted will depend on the actual programmed parameters and patient factors and may differ significantly from these estimates.

Statistical and Data Analysis Methods

The performance is expressed in terms of device survival estimates, where "survival" refers to the function of the device, not the survival of the patient. These survival estimates are intended to illustrate the probability that a device will survive for a given number of years without a chronic device-related complication.

Active surveillance normally begins at the time of implant and continues until a product performance or censoring event occurs. Of the several different statistical methods available for survival analysis, PPR survival analysis is estimated using the Standard Actuarial Method, with suspensions assumed distributed evenly within the intervals (Cutler-Ederer Method), and incorporated data from these retrospectively enrolled devices. Thus, in some cases sample sizes may fluctuate from one time interval to the next interval.

The survival estimates is the probability that a device is free of a product performance event or normal battery depletion at a given time point. For example, if a survival probability is 95% after 5 years of service, then the device has a 5% chance of experiencing a related complication or battery depletion in the first 5 years following implant.

Since the survival estimate can become very imprecise with small effective sample sizes, Medtronic truncates the survival curve when the effective sample size is less than 100 devices. The survival charts in the Product Performance Report show the effective sample size for each year interval where we have experience. When the effective sample size reaches 100, the next data point is added to the survival curve.

Methods for Estimating Transcatheter Pacing Performance continued

Because the de-identified information pulled from the CareLink™ network allows for assessment of all devices that were taken out of service there are no adjustments done for underreporting of malfunctions or battery depletion.

Definition of Analysis Dataset

To be included in the US survival analysis dataset, the product must have been successfully implanted and on the CareLink™ network for at least 30 days.

US Reports of Acute Observations

In the first weeks following implantation, physiologic responses and performance can vary until long-term stability is attained. Acute performance may be subject to a number of factors, including patient-specific anatomy, clinical conditions and/or varying implant conditions/techniques. After a period of time, the implant and performance stabilizes. It is for this reason that the CareLink™ analysis, which is intended to measure long-term performance, do not include complications that occur within the first 30 days after implant.

Acute performance information, defined as the first month after implant, but not including the day of the implant procedure, is included in our reporting. The source of this information is the Medtronic complaint handling system database that includes events reported to Medtronic. This information is summarized in tables titled "Acute Observations".

Each Event Report received by Medtronic's complaint handling system is assigned one or more Reason for Report codes based on the information received. The Reason for Report codes have been grouped into Acute Observation categories. The categories are:

- Cardiac Perforation
- Dislodgement
- Failure to Capture
- Failure to Sense
- Elevated Pacing Threshold

Although multiple observations are possible for any given Micra, only one observation is reported per device. The observation reported is the observation highest on the list. For example, if an Event Report includes observations for both Cardiac Perforation and Elevated Pacing Thresholds, Cardiac Perforation is reported.

The event reported to Medtronic may or may not have involved clinical action or product returned to Medtronic. The product may have remained implanted and in service.

US Reports of the Day of Implant Observations

Due to the procedural differences with Micra products compared to transvenous leads and IPGs, information about the clinical experience on the day of implant is included in our reporting. The source of this information is the Medtronic complaint handling system database that includes events reported to Medtronic which may be related to either the Micra device or the delivery system. The information is summarized in tables titled "Day of Implant Observations."

Methods for Estimating Transcatheter Pacing Performance continued

Each Event Report received by Medtronic's complaint handling system is assigned one or more Reason for Report codes based on the information received. The Reason for Report codes have been grouped into Day of Implant Observation categories. The categories are:

- Cardiac Perforation
- Dislodgement
- Failure to Capture
- Failure to Sense
- Elevated Pacing Threshold

Although multiple observations are possible for any given Micra, only one observation is reported per device. The observation reported is the observation highest on the list. For example, if an Event Report includes observations for both Cardiac Perforation and Elevated Pacing Thresholds, Cardiac Perforation is reported.

The event reported to Medtronic may or may not have involved clinical action or product returned to Medtronic. The product may have remained implanted and in service.

MC1VR01 Micra VR

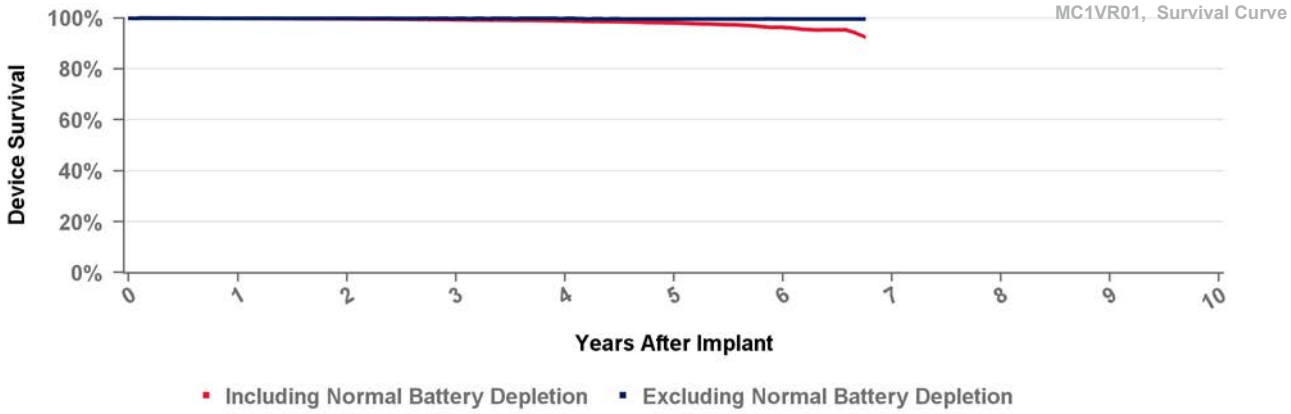
US Market Release	06Apr2016
CE Approval Date	14Apr2015
Registered USA Implants	72,237

CareLink Population

Enrolled	45,764
Active	31,467
Cumulative Follow-Up Months	1,335,166
Normal Battery Depletions	254

CareLink Qualifying Malfunctions/Complications

Cardiac Perforation	7
Dislodgements	2
Elevated Pacing Threshold	41
Failure to Capture	8
Premature Battery Depletion	12



Years	1	2	3	4	5	6	at 81 mo
Excluding NBD	99.9%	99.9%	99.8%	99.8%	99.7%	99.6%	99.6%
Including NBD	99.9%	99.7%	99.3%	98.9%	98.1%	96.3%	92.5%
Effective Sample Size	36416	25304	16056	9358	3952	1067	139

***Acute Observations (N = 72,237)**

Cardiac Perforation	21
Dislodgement	22
Elevated Pacing Threshold	165
Failure to Capture	80
Failure to Sense	17

***Day of Implant Observations (N = 72,237)**

Cardiac Perforation	290
Dislodgement	172
Elevated Pacing Threshold	261
Failure to Capture	129
Failure to Sense	72

The rate of perforation for commercially released Micra VR devices continues to perform acceptably within levels observed within the post-approval clinical study registry. Overall, clinical studies have demonstrated a reduction in the risk of major complications of 63% through 12 months[1] and 57% through 36 months[2] relative to transvenous pacing systems.

1. El-Chami et al. Heart Rhythm 2018 15(12): 1800-1807.
2. Piccini et al. Heart Rhythm 2020 17(5 Supplement) D-PO02-089

* Data in these tables is sourced direct from the MDT complaint handling database summarizing observations reported to Medtronic relative to the registered US implant population.

MC1AVR1 Micra AV

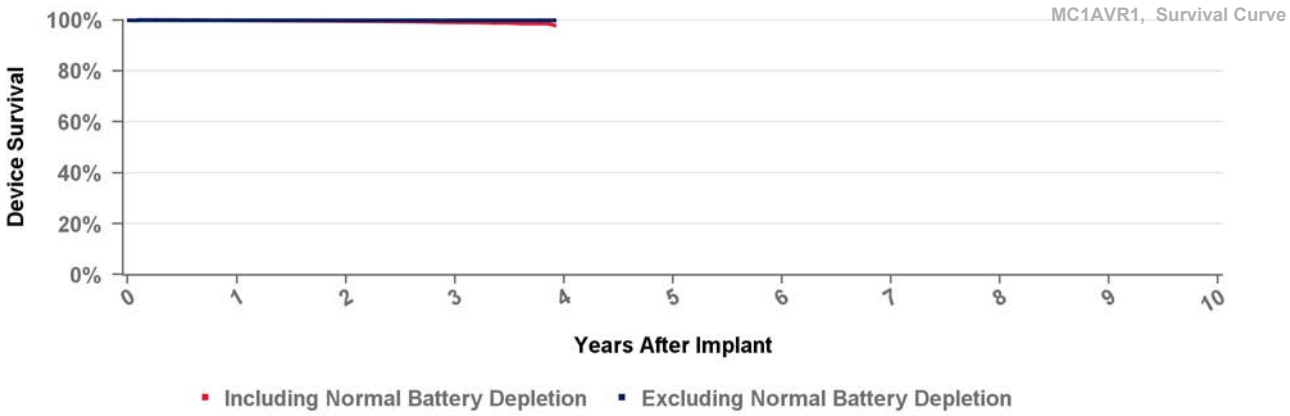
US Market Release	15Jan2020
CE Approval Date	31Mar2020
Registered USA Implants	49,171

CareLink Population

Enrolled	30,661
Active	25,240
Cumulative Follow-Up Months	547,387
Normal Battery Depletions	67

CareLink Qualifying Malfunctions/Complications

Dislodgements	3
Elevated Pacing Threshold	11
Failure to Capture	6
Premature Battery Depletion	6



Years	1	2	3	at 47 mo
Excluding NBD	99.9%	99.9%	99.8%	99.8%
Including NBD	99.9%	99.7%	99.1%	97.9%
Effective Sample Size	20071	9583	3049	157

***Acute Observations (N = 49,171)**

Cardiac Perforation	13
Dislodgement	28
Elevated Pacing Threshold	88
Failure to Capture	42
Failure to Sense	119

***Day of Implant Observations (N = 49,171)**

Cardiac Perforation	255
Dislodgement	83
Elevated Pacing Threshold	137
Failure to Capture	76
Failure to Sense	37

The rate of perforation for commercially released Micra AV devices continues to perform acceptably within levels observed within the post-approval clinical study registry. Overall, predicate clinical studies for Micra VR have demonstrated a reduction in the risk of major complications of 63% through 12 months[1] and 57% through 36 months[2] relative to transvenous pacing systems.

1. El-Chami et al. Heart Rhythm 2018 15(12): 1800-1807.
2. Piccini et al. Heart Rhythm 2020 17(5 Supplement) D-PO02-089

* Data in these tables is sourced direct from the MDT complaint handling database summarizing observations reported to Medtronic relative to the registered US implant population.

Method for Estimating Lead Performance

Medtronic Cardiac Rhythm Management (CRM) has tracked lead survival for over 40 years with its multicenter, global chronic lead studies.

Leads Performance Analysis

Implanted leads operate in the challenging biochemical environment of the human body and the body's response to foreign objects. Implanted leads are also subject to mechanical stresses associated with heart motion, body motion, and patient anatomy.

In this environment, pacemaker and defibrillation leads cannot be expected to last forever. While IPGs and ICDs have a battery that will deplete after a predictable length of time, a lead's longevity cannot be predicted easily based on mechanical measurements, nor are there simple indicators that a lead is approaching the end of its service life. Therefore, regular monitoring while implanted, and evaluation of lead integrity upon IPG or ICD replacement, is necessary to determine if a lead may be approaching the end of its service life.

Shortfalls Of Using Returned Product And Complaints To Estimate Lead Performance

Leads and lead segments returned to Medtronic are analyzed to determine whether or not they meet performance limits established by Medtronic. Although returned product analyses are valuable for gaining insight into lead failure mechanisms, this data cannot be used by itself for determining the survival probability of leads because only a small fraction of leads are explanted and returned for analysis. Some leads are modified due to adverse device effect, however may not be explanted. Additionally, those leads that are returned cannot be assumed to be statistically representative of the performance of the total population for a given lead model. Partial or total lead extraction can result in significant damage to a lead, making a definitive analysis of a suspected failure, and its cause, impossible.

To account for the under reporting inherent with lead survival analysis based solely on returned product, some manufacturers add reported complaints where adverse product performance is evident but the product itself has not been returned. The improvement to the accuracy of survival estimates depends on the degree to which all complaints are actually communicated to the manufacturer. Since not all complaints are communicated to the manufacturer, adding complaints to the survival analysis does not completely solve the under reporting problem.

Lead survival probabilities are more appropriately determined through a prospective clinical surveillance study that includes active follow up with the patients. Although Medtronic monitors returned product analysis and complaints, these are not used to determine lead survival estimates.

Medtronic consolidated all cardiac rhythm surveillance registries into the PAN Registry. The PAN Registry is a patient centric surveillance platform which follows patients implanted with Medtronic cardiac rhythm product(s). The Product Performance Report (PPR) tracks PAN Registry enrolled patients to monitor lead performance status in vivo. The PAN Registry is designed to record clinical observations representative of the total clinical experience. Lead survival estimates include both lead hardware failure and lead-related clinical events that are classified as product performance events, and do not differentiate a lead hardware failure from other clinical events such as Failure to capture, perforation, dislodgement, or concurrent pulse generator failure.

PAN Registry

Medtronic has been monitoring the performance of its cardiac therapy products with a multicenter study since 1983 and has evaluated the performance of more than 131,000 leads, with data reported from countries around the world. Throughout this time period, Medtronic has continually worked to adapt systems and processes to more effectively monitor product performance following market release. The following summarizes current registry requirements.

Method for Estimating Lead Performance continued

Medtronic's product surveillance registry is a world-wide study that has a prospective, non-randomized, observational design. A key purpose of the registry is to provide continuing evaluation and periodic reporting of the long-term reliability and performance of Medtronic market-released cardiac rhythm therapy products. Product-related adverse events, indicating the status of the product, are collected to measure product survival probabilities. The data gathered may also be used to support the design and development of new cardiac therapy products. The registry is designed to continue indefinitely, encompassing new products as they become commercially available.

To ensure a sufficiently large and representative source of data, participating clinical sites must meet pre-specified selection criteria. Patients are enrolled upon implantation of a Medtronic Cardiac rhythm product. Every effort is made to ensure participants are representative of the range of clinical environments in which Medtronic cardiac rhythm products are used. Eligible products for enrollment include Medtronic market-released cardiac rhythm therapy products for which additional information to further characterize product performance following market release is desired. Number of enrollments is reviewed regularly to ensure adequate sample size is obtained for each individual product. Enrollment may be capped and follow-up discontinued when sufficient duration and precision is achieved to effectively characterize product survivability.

Enrolled patients are followed in accordance with the standard care practices of their care provider from their implant date until they can no longer be followed (e.g., death, lost to follow-up, etc.). However, to ensure regular patient status assessments are completed, follow-up windows consistent with typical care practices have been established with a minimum annual follow-up requirement. Product-related adverse events, system modifications and changes in patient status (e.g. death and withdrawal from the study) are required to be reported upon occurrence. This active surveillance model ensures a robust dataset for effectively monitoring product performance.

Patients are eligible for enrollment if:

- Patient is intended to be implanted or has been implanted with a Medtronic market-released cardiac lead connected to a market-released CRT, ICD, or IPG device, and the lead is used for a pacing, sensing, or defibrillation application, or
- Patient participated in a qualifying investigational study of a Medtronic cardiac rhythm product that is now market-released; complete implant and follow-up data are available; and the data can be appropriately and legally released

Each site is required to inform Medtronic whenever a lead event has occurred, a lead is modified, or when a patient is no longer participating. Timely, accurate, and complete reporting and analysis of safety information for surveillance is crucial for the protection of patients, clinicians, and the sponsor. Medtronic continually evaluates the quality and integrity of the data through a combination of on-site and centralized monitoring activities.

Lead Complications

Chronic lead performance is characterized by estimating lead related complication free survival probabilities. For analysis purposes, the complication criteria, which align with the AdvaMed 'Industry Guidance for Uniform Reporting of Clinical Performance of Cardiac Rhythm Management Pulse Generators and Leads', are defined below. These criteria do not, however, enable a lead integrity or "hardware" failure to be conclusively differentiated from other clinical events such as an undetected lead dislodgement, perforation, or concurrent pulse generator failure manifested as a sensing or capture problem.

Method for Estimating Lead Performance continued

All reported lead-related adverse events are classified by the reporting investigator and are adjudicated by an independent event adjudication committee[1]. A lead-related event with at least one of the following classifications that is adjudicated by the committee as a complication and occurs more than 30 days after implant is considered a product performance event and will contribute to the survival analysis endpoint. Events with an onset date of 30 days or less after the implant are considered procedure related and therefore are not included as product performance events.

Product performance events include, but are not limited to:

- Failure to capture
- Failure to sense/undersensing
- Oversensing
- Elevated pacing thresholds
- Abnormal pacing impedance (based on lead model, but normal range is typically 200 - 2,000 ohms)
- Abnormal defibrillation impedance (based on lead model, but normal range is typically 20 - 200 ohms)
- Lead Insulation breach
- Lead Conductor fracture, confirmed electrically, visually or radiographically
- Extracardiac stimulation
- Cardiac perforation
- Lead dislodgement
- Structural Lead Failure

Data Analysis Methods

The performance of leads is expressed in terms of lead survival estimates, where "survival" refers to the function of the lead, not the survival of the patient. These survival estimates are intended to illustrate the probability that a lead will survive for a given number of years without a chronic lead-related complication.

Active surveillance normally begins at the time of implant and continues until a product performance or censoring event occurs. In some cases, in the PAN Registry, active surveillance of a device starts after the device was implanted. The survival probability of such device is conditional on survival to the time when the device enters the Registry. This phenomenon is called Left-truncation[2]. PPR lead survival analysis is estimated using the Kaplan-Meier method, a statistical method to incorporate data from these retrospectively enrolled devices, left-truncated data, was applied. The statistical technique uses data from existing devices while appropriately adjusting the device survival curves for the time the device was not actively followed in the registry. Thus, in some cases sample sizes may fluctuate from one time interval to the next interval.

On the following pages, each graph includes a survival curve for each lead model. The survival estimates is the probability that a lead is free of a product performance event at a given time point. For example, if a survival probability is 95% after 5 years of service, then the lead has a 5% chance of experiencing a lead-related complication in the first 5 years following implant.

The data in the tables is rounded to the nearest tenth of one percent. Occasionally, a graph may show 100% survival, but have one or more complications. This occurs because even with the complications, the data rounds to 100%.

The survival curves are statistical estimates. As sample size increases and performance experience accumulates, the estimation improves. Confidence intervals are provided as a way to indicate the degree of certainty of the estimates. Greenwood's formula is used to calculate the standard errors, and the log-log method is used to produce the 2-sided 95% confidence bounds.

Method for Estimating Lead Performance continued

Since the survival estimate can become very imprecise with small effective sample sizes, Medtronic truncates the survival curve when the number of leads entering an interval is less than 50 leads. When the number of leads entering an interval reaches 50, the next data point is added to the survival curve. For those lead models that do not have sufficient sample size, a survival curve will not be presented.

Definition of Analysis Dataset

The survival estimates are derived from all device components successfully enrolled as of the data received cut-off date (e.g. date of data entry at a study site). The number of enrollments is listed for each lead model.

This sample is considered to be representative of the worldwide population, and therefore the survival estimates shown should be representative of the performance worldwide of these models.

Criteria for Model Inclusion

Survival probabilities and the associated study information for a model or model family will be published when more than 100 leads have been enrolled and no fewer than 50 leads followed for at least 6 months. Medtronic, at its discretion, may stop providing updated performance information on lead models that received original US market-release approval 20 or more years ago.

Returned Product Analysis Results

Although the returned product analysis data is not used to generate the survival estimates, the data provides valuable insight into the causes of lead malfunction.

For reporting returned product analysis results, Medtronic CRM considers a lead as having malfunctioned whenever the analysis shows that any parameter was outside the performance limits established by Medtronic while implanted and in service. To be considered a malfunction for returned product analysis reporting, the lead must have been returned to Medtronic and analyzed.

The results of the analysis are presented in four categories. The lead reporting categories are:

> **Conductor Fracture**: Conductor malfunction with complete or intermittent loss of continuity that could interrupt current flow (e.g., fractured conductors), including those associated with clavicle flex fatigue or crush damage.
>
> **Insulation Breach**: A malfunction of the insulation allowing inappropriate entry of body fluids or inappropriate current flow between the conductors, or between the conductor and the body. Examples include cuts, tears, depressions, abrasions, and material degradation.
>
> **Crimps/Welds/Bonds**: Any malfunction in a conductor or lead body associated with a point of connection.
>
> **Other:** Malfunctions of specific lead mechanical attributes, such as sensors, connectors, seal rings, or malfunction modes not included in the three categories above.

A lead subject to a safety advisory is not considered to have malfunctioned unless it has been returned to Medtronic CRM and found, through analysis, to actually have performed outside the performance limits established by Medtronic.

Method for Estimating Lead Performance continued

For leads designed for either ventricular or atrial use, the numbers listed in the Returned Product Analysis tables include both.

The numbers of malfunctions listed in the Returned Product Analysis tables are the actual numbers confirmed in the returned product analysis. The numbers of complications listed in the complications tables are the actual numbers observed in the PSR centers around the world.

US Reports of Acute Lead Observations (Occurring within First Month of Service)

In the first weeks following lead implantation, physiologic responses and lead performance can vary until long-term lead stability is attained. Acute (defined as the first month after implant) lead performance may be subject to a number of factors, including patient-specific anatomy, clinical conditions and/or varying implant conditions/techniques. After a period of time, the implant and the lead performance stabilizes. It is for this reason that the Product Surveillance Registry results, which are intended to measure long-term performance, do not include complications that occur within the first 30 days after implant.

Information about the clinical experience in the first month of service is included in our reporting. The source for this information is Medtronic's complaint handling system database. The information is summarized in tables titled "US Reports of Acute Lead Observations."

Each Event Report received by Medtronic's complaint handling system is assigned one or more Reason for Report codes based on the information received. The Reason for Report codes have been grouped into Acute Lead Observation categories. The categories used for this product performance reporting are drawn from the "FDA Guidance for Submission of Research and Marketing Applications for Permanent Pacemaker Leads and for Pacemaker Lead Adapter 510(k) Submissions." The categories are:

- Cardiac Perforation
- Conductor Fracture
- Lead Dislodgement
- Failure to Capture
- Oversensing
- Failure to Sense
- Insulation Breach
- Impedance Abnormal
- Extracardiac Stimulation
- Unspecified

Although multiple observations are possible for any given lead, only one observation is reported per lead. The observation reported is the observation highest on the list. For example, if an Event Report includes observations for both Lead Dislodgement and Failure to Sense, Lead Dislodgement is reported.

The lead event reported to Medtronic may or may not have involved clinical action or product returned to Medtronic. The lead may have remained implanted and in service.

Method for Estimating Lead Performance continued

Estimated Number of Implanted and Active Leads in the United States

In addition to providing the number of leads enrolled in the PSR, we also provide the number of leads registered as implanted and the number remaining active in the United States based on the status recorded in the Medtronic Device Registration Tracking Application (DTrak).

Footnotes:

[1]During the evolution of SLS, event adjudication was transitioned from a Medtronic technical review committee to an independent event adjudication committee in 2011. Data analyses include adjudication using both methods.

[2]Klein, John P., Moeschberger, Melvin L. Survival Analysis Techniques for Censored and Truncated Data, New York: Springer-Verlag New York, Inc., 1997.

3830 SelectSecure

US Market Release	03Aug2005
CE Approval	31Jan2003
Registered USA Implants	213,132
Estimated Active USA Implants	182,541
Fixation Type	Fixed Screw
Pace Sense Polarity	Bipolar
Steroid Indicator	Yes

US Returned Product Analysis

Conductor Fracture	39
Insulation Breach	90
Crimp/Weld/Bond	0
Other	14

US Acute Lead Observations

Cardiac Perforation	73
Conductor Fracture	5
Extra Cardiac Stimulation	11
Failure to Capture	578
Failure to Sense	88
Impedance Out of Range	47
Insulation Breach	2
Lead Dislodgement	722
Oversensing	120
Unspecified Clinical Failure	2

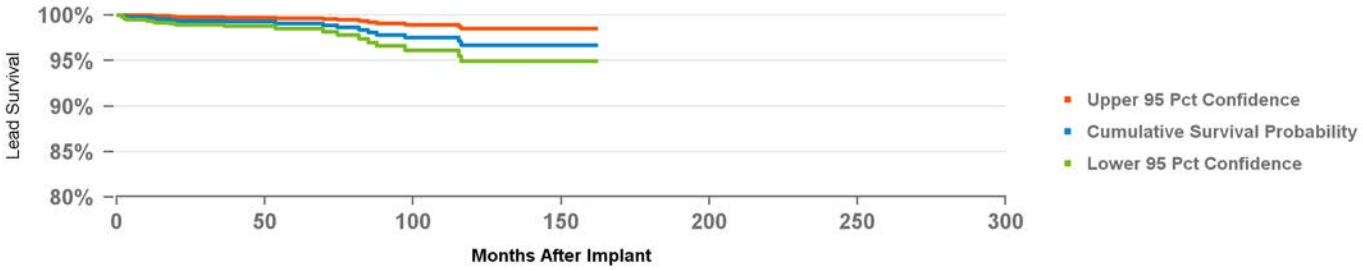
Atrial Placement

Product Surveillance Registry Results

Number of Leads Enrolled in Study	1,827
Number of Leads Active in Study	703
Cumulative Months of Follow-Up	88,926

Qualifying Complications 19

Cardiac Perforation	1	Impedance Out of Range	2
Conductor Fracture	3	Insulation (not further defined)	1
Extra Cardiac Stimulation	1	Lead Dislodgement	4
Failure to Capture	4	Other	0
Failure to Sense	3		



Years	1	2	3	4	5	6	7	8	9	10	11	12	13	at 162 mo
%	99.6%	99.3%	99.3%	99.2%	99.1%	98.9%	98.4%	97.8%	97.5%	96.7%	96.7%	96.7%	96.7%	96.7%
#	1,394	1,083	887	678	536	444	366	315	268	219	192	152	77	53

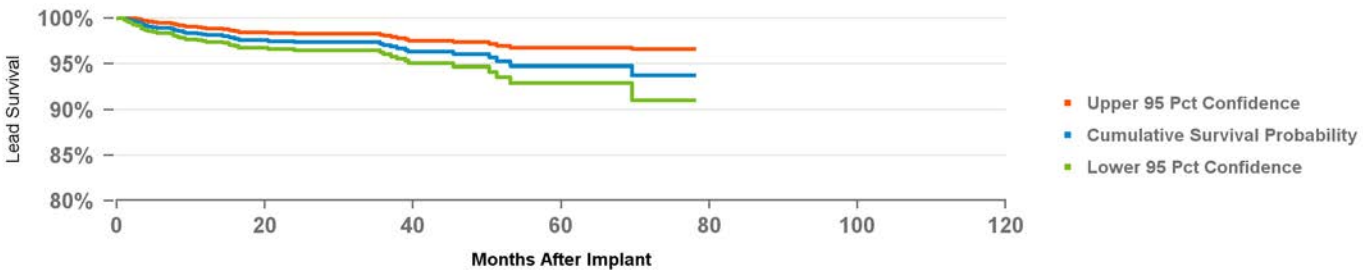
His Bundle Placement

Product Surveillance Registry Results

Number of Leads Enrolled in Study	1,490
Number of Leads Active in Study	957
Cumulative Months of Follow-Up	45,837

Qualifying Complications 44

Failure to Capture	33	Impedance Out of Range	0
Failure to Sense	3	Lead Dislodgement	5
		Oversensing	1
		Other	2



Years	1	2	3	4	5	6	at 78 mo
%	98.2%	97.3%	97.0%	96.0%	94.8%	93.7%	93.7%
#	1,158	884	576	308	143	79	61

Ventricular Placement

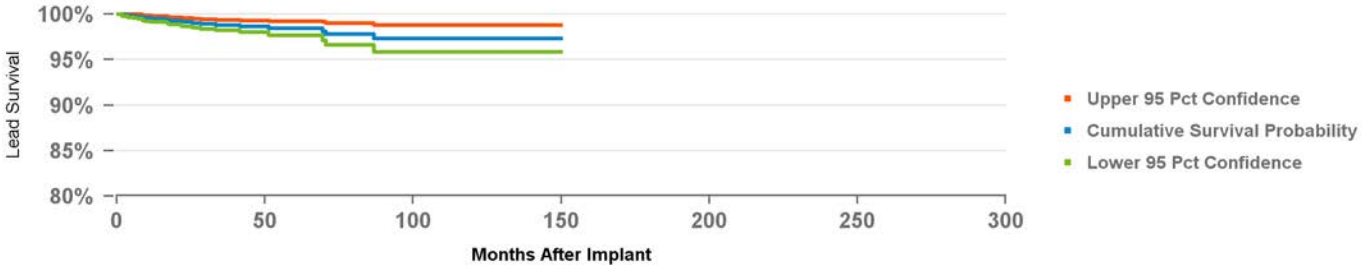
Product Surveillance Registry Results

Number of Leads Enrolled in Study	2,575
Number of Leads Active in Study	1,626
Cumulative Months of Follow-Up	82,642

Qualifying Complications

Failure to Capture	12	Impedance Out of Range	2
		Lead Dislodgement	8
		Other	1

23



Years	1	2	3	4	5	6	7	8	9	10	11	12	at 150 mo
%	99.5%	99.1%	98.8%	98.6%	98.4%	97.8%	97.8%	97.3%	97.3%	97.3%	97.3%	97.3%	97.3%
#	1,829	1,156	813	501	369	286	230	187	159	121	106	87	68

4074 CapSure Sense

US Market Release	23Jun2002
CE Approval	01Feb2002
Registered USA Implants	154,996
Estimated Active USA Implants	74,234
Fixation Type	Tines
Pace Sense Polarity	Bipolar
Steroid Indicator	Yes

US Returned Product Analysis

Conductor Fracture	15
Insulation Breach	59
Crimp/Weld/Bond	0
Other	0

US Acute Lead Observations

Cardiac Perforation	34
Conductor Fracture	2
Extra Cardiac Stimulation	3
Failure to Capture	190
Failure to Sense	17
Impedance Out of Range	9
Lead Dislodgement	208
Oversensing	9

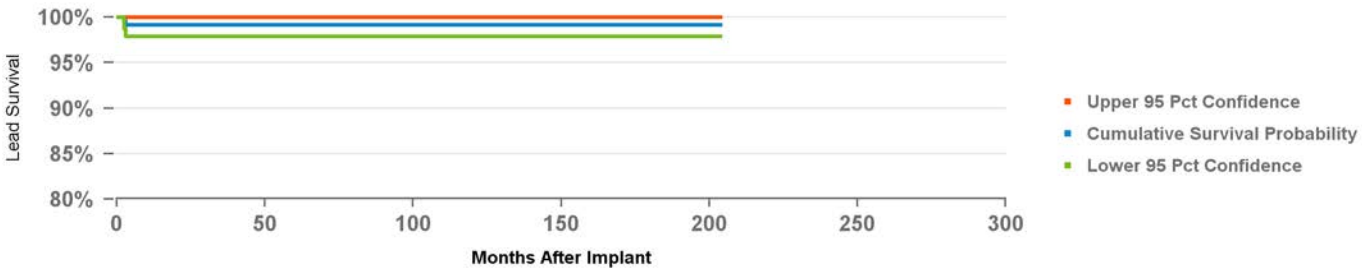
Atrial Placement

Product Surveillance Registry Results

Number of Leads Enrolled in Study	227
Number of Leads Active in Study	60
Cumulative Months of Follow-Up	29,505

Qualifying Complications 2

Failure to Capture	0	Impedance Out of Range	0
Failure to Sense	1	Lead Dislodgement	1
		Other	0



Years	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	at 204 mo
%	99.1%	99.1%	99.1%	99.1%	99.1%	99.1%	99.1%	99.1%	99.1%	99.1%	99.1%	99.1%	99.1%	99.1%	99.1%	99.1%	99.1%
#	214	205	198	183	167	158	148	136	126	117	110	107	99	95	88	77	56

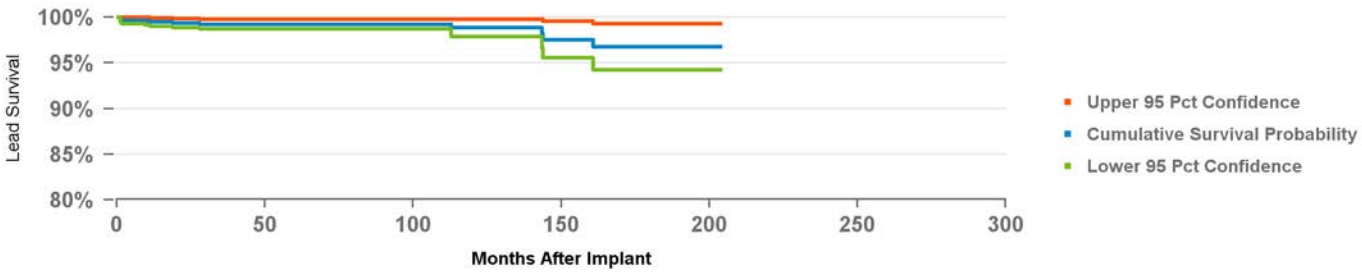
Ventricular Placement

Product Surveillance Registry Results

Number of Leads Enrolled in Study	1,193
Number of Leads Active in Study	158
Cumulative Months of Follow-Up	80,631

Qualifying Complications 12

Conductor Fracture	1	Impedance Out of Range	2
Failure to Capture	4	Insulation (not further defined)	2
		Lead Dislodgement	2
		Other	1



Years	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	at 204 mo
%	99.5%	99.3%	99.2%	99.2%	99.2%	99.2%	99.2%	99.2%	99.2%	98.8%	98.8%	97.5%	97.5%	96.7%	96.7%	96.7%	96.7%
#	1,029	880	739	633	488	395	338	294	258	212	175	153	125	117	111	88	58

4076 CapSureFix Novus

US Market Release	25Feb2004
CE Approval	14Jun2004
Registered USA Implants	819,485
Estimated Active USA Implants	474,265
Fixation Type	Active Screw In
Pace Sense Polarity	Bipolar
Steroid Indicator	Yes

US Returned Product Analysis

Conductor Fracture	130
Insulation Breach	222
Crimp/Weld/Bond	2
Other	23

US Acute Lead Observations

Cardiac Perforation	261
Conductor Fracture	11
Extra Cardiac Stimulation	27
Failure to Capture	396
Failure to Sense	288
Impedance Out of Range	76
Insulation Breach	2
Lead Dislodgement	913
Oversensing	150
Unspecified Clinical Failure	10

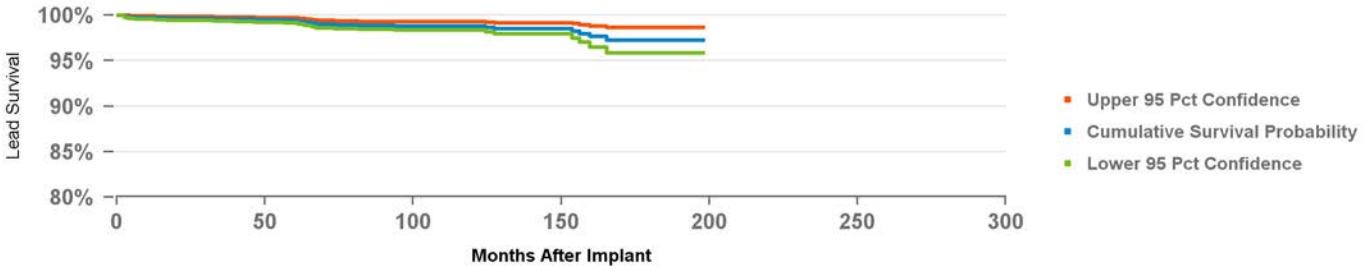
Atrial Placement

Product Surveillance Registry Results

Number of Leads Enrolled in Study	4,928
Number of Leads Active in Study	1,759
Cumulative Months of Follow-Up	281,736

Qualifying Complications 38

Cardiac Perforation	2	Impedance Out of Range	0
Conductor Fracture	3	Insulation (not further defined)	3
Failure to Capture	9	Lead Dislodgement	14
Failure to Sense	3	Oversensing	2
		Other	2



Years	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	at 198 mo
%	99.7%	99.6%	99.6%	99.5%	99.4%	99.0%	98.9%	98.8%	98.8%	98.8%	98.5%	98.5%	98.2%	97.2%	97.2%	97.2%	97.2%
#	3,517	3,022	2,647	2,298	1,916	1,650	1,451	1,266	1,064	846	615	459	341	210	141	89	63

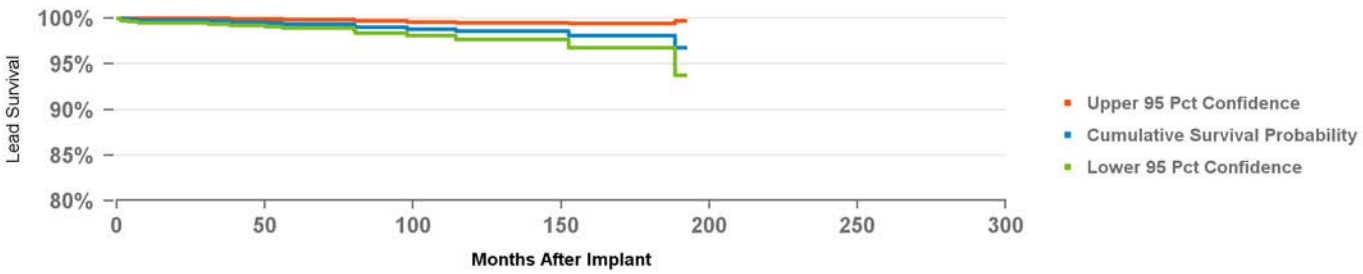
Ventricular Placement

Product Surveillance Registry Results

Number of Leads Enrolled in Study	1,770
Number of Leads Active in Study	318
Cumulative Months of Follow-Up	119,246

Qualifying Complications 14

Conductor Fracture	1	Impedance Out of Range	2
Extra Cardiac Stimulation	1	Lead Dislodgement	1
Failure to Capture	6	Other	2
Failure to Sense	1		



Years	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	at 192 mo
%	99.7%	99.7%	99.7%	99.6%	99.3%	99.3%	99.0%	99.0%	98.8%	98.5%	98.5%	98.5%	98.1%	98.1%	98.1%	96.7%
#	1,451	1,296	1,145	985	785	672	564	485	421	350	283	228	191	131	91	59

4092 CapSure SP Novus

US Market Release	17Sep1998
CE Approval	15Apr1998
Registered USA Implants	186,242
Estimated Active USA Implants	36,298
Fixation Type	Tines
Pace Sense Polarity	Bipolar
Steroid Indicator	Yes

US Returned Product Analysis

Conductor Fracture	21
Insulation Breach	99
Crimp/Weld/Bond	0
Other	0

US Acute Lead Observations

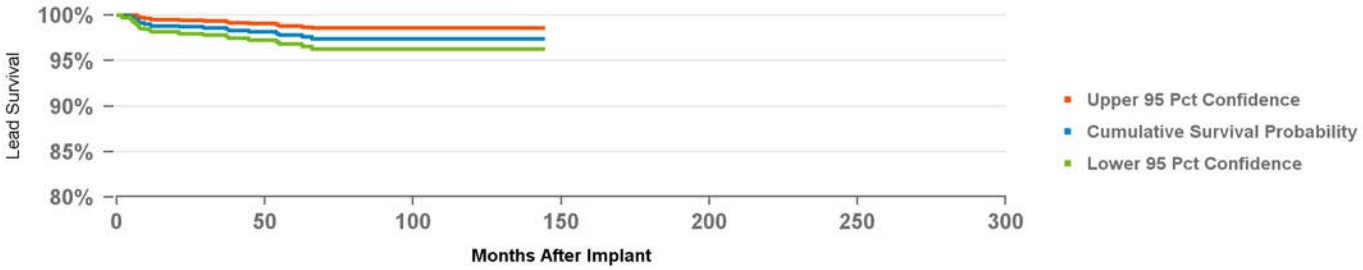
Cardiac Perforation	4
Conductor Fracture	4
Extra Cardiac Stimulation	1
Failure to Capture	35
Impedance Out of Range	2
Insulation Breach	1
Lead Dislodgement	35
Oversensing	1
Unspecified Clinical Failure	1

Product Surveillance Registry Results

Number of Leads Enrolled in Study	1,202
Number of Leads Active in Study	12
Cumulative Months of Follow-Up	70,183

Qualifying Complications 21

Conductor Fracture	3	Impedance Out of Range	1
Extra Cardiac Stimulation	1	Lead Dislodgement	4
Failure to Capture	12	Other	0



Years	1	2	3	4	5	6	7	8	9	10	11	at 144 mo
%	98.8%	98.7%	98.5%	98.1%	97.8%	97.4%	97.4%	97.4%	97.4%	97.4%	97.4%	97.4%
#	921	822	734	629	515	402	333	279	239	157	93	57

4574 CapSure Sense

US Market Release	23Jun2002
CE Approval	01Feb2002
Registered USA Implants	119,697
Estimated Active USA Implants	67,629
Fixation Type	J-shape, tines
Pace Sense Polarity	Bipolar
Steroid Indicator	Yes

US Returned Product Analysis

Conductor Fracture	14
Insulation Breach	26
Crimp/Weld/Bond	0
Other	0

US Acute Lead Observations

Cardiac Perforation	4
Conductor Fracture	1
Extra Cardiac Stimulation	1
Failure to Capture	167
Failure to Sense	83
Impedance Out of Range	11
Lead Dislodgement	279
Oversensing	17
Unspecified Clinical Failure	4

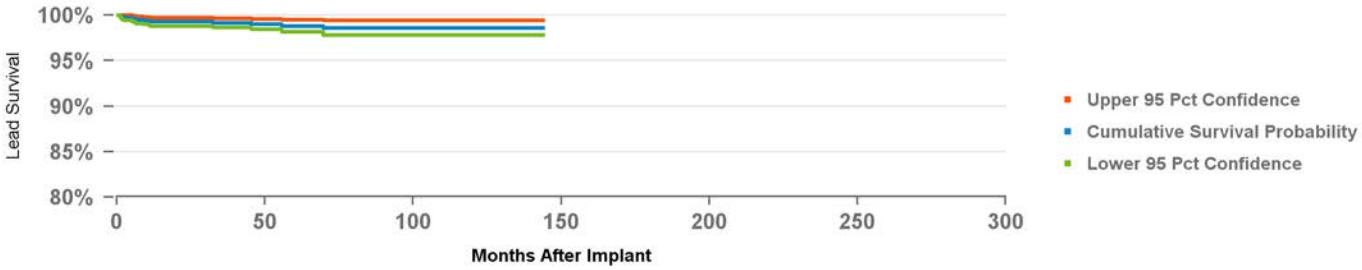
Product Surveillance Registry Results

Number of Leads Enrolled in Study	1,738
Number of Leads Active in Study	710
Cumulative Months of Follow-Up	80,145

Qualifying Complications

15

Conductor Fracture	2	Impedance Out of Range	0
Failure to Capture	6	Lead Dislodgement	7
		Other	0



Years	1	2	3	4	5	6	7	8	9	10	11	at 144 mo
%	99.2%	99.2%	99.1%	99.0%	98.8%	98.6%	98.6%	98.6%	98.6%	98.6%	98.6%	98.6%
#	1,308	995	785	640	514	429	363	291	215	152	96	53

4592 CapSure SP Novus

US Market Release	05Oct1998
CE Approval	15Apr1998
Registered USA Implants	89,801
Estimated Active USA Implants	19,779
Fixation Type	J-shape, tines
Pace Sense Polarity	Bipolar
Steroid Indicator	Yes

US Returned Product Analysis

Conductor Fracture	17
Insulation Breach	34
Crimp/Weld/Bond	0
Other	0

US Acute Lead Observations

Failure to Capture	10
Failure to Sense	2
Insulation Breach	1
Lead Dislodgement	37
Oversensing	2
Unspecified Clinical Failure	2

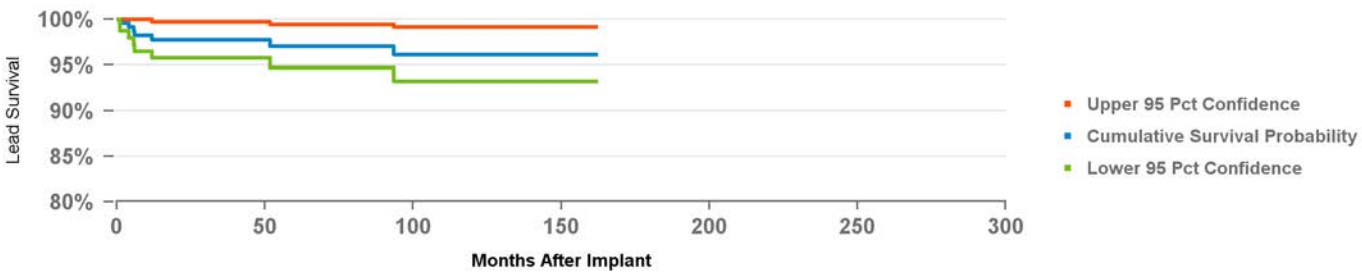
Product Surveillance Registry Results

Number of Leads Enrolled in Study	369
Number of Leads Active in Study	30
Cumulative Months of Follow-Up	22,842

Qualifying Complications

9

Failure to Capture	4	Impedance Out of Range	0
Failure to Sense	1	Lead Dislodgement	3
		Other	1



Years	1	2	3	4	5	6	7	8	9	10	11	12	13	at 162 mo
%	97.7%	97.7%	97.7%	97.7%	97.0%	97.0%	97.0%	96.1%	96.1%	96.1%	96.1%	96.1%	96.1%	96.1%
#	204	182	167	158	134	126	109	105	99	87	82	78	57	51

5054 CapSure Z Novus

US Market Release	03Jun1998
CE Approval	05Jun1997
Registered USA Implants	100,058
Estimated Active USA Implants	18,414
Fixation Type	Tines
Pace Sense Polarity	Bipolar
Steroid Indicator	Yes

US Returned Product Analysis

Conductor Fracture	16
Insulation Breach	47
Crimp/Weld/Bond	1
Other	0

US Acute Lead Observations

Cardiac Perforation	2
Conductor Fracture	2
Failure to Capture	23
Impedance Out of Range	4
Insulation Breach	1
Lead Dislodgement	30
Unspecified Clinical Failure	9

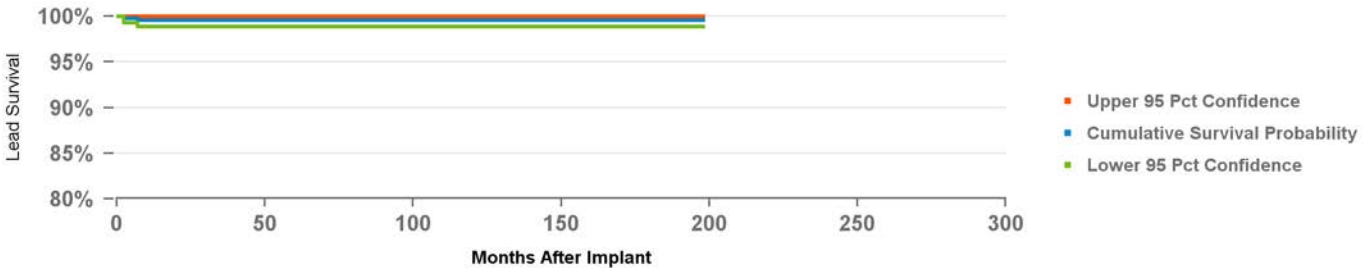
Atrial Placement

Product Surveillance Registry Results

Number of Leads Enrolled in Study	425
Number of Leads Active in Study	27
Cumulative Months of Follow-Up	42,117

Qualifying Complications 3

Failure to Capture	2	Impedance Out of Range	0
		Lead Dislodgement	1
		Other	0



Years	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	at 198 mo
%	99.5%	99.5%	99.5%	99.5%	99.5%	99.5%	99.5%	99.5%	99.5%	99.5%	99.5%	99.5%	99.5%	99.5%	99.5%	99.5%	99.5%
#	411	391	358	322	289	252	219	185	152	128	107	92	74	64	58	51	50

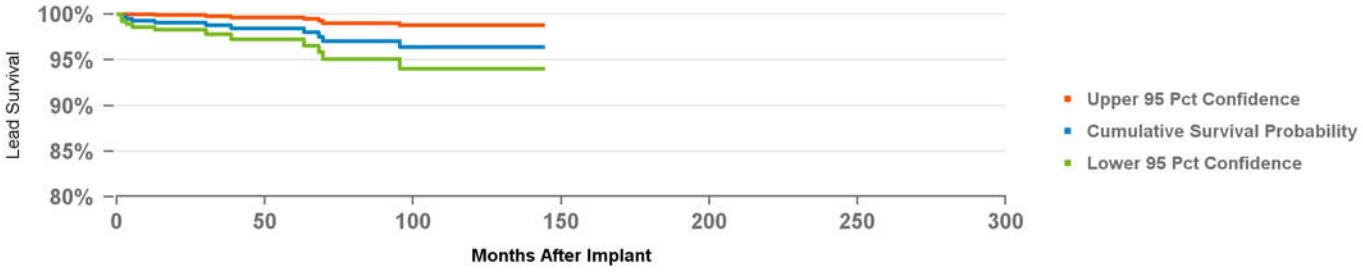
Ventricular Placement

Product Surveillance Registry Results

Number of Leads Enrolled in Study	992
Number of Leads Active in Study	14
Cumulative Months of Follow-Up	35,754

Qualifying Complications 13

Failure to Capture	7	Impedance Out of Range	1
Failure to Sense	2	Lead Dislodgement	1
		Other	2



Years	1	2	3	4	5	6	7	8	9	10	11	at 144 mo
%	99.3%	99.1%	98.8%	98.4%	98.4%	97.0%	97.0%	96.4%	96.4%	96.4%	96.4%	96.4%
#	474	391	304	264	230	192	167	144	114	94	72	54

5076 CapSureFix Novus

US Market Release	31Aug2000
CE Approval	12Aug1999
Registered USA Implants	3,351,058
Estimated Active USA Implants	1,888,453
Fixation Type	Active Screw In
Pace Sense Polarity	Bipolar
Steroid Indicator	Yes

US Returned Product Analysis

Conductor Fracture	1,510
Insulation Breach	1,611
Crimp/Weld/Bond	4
Other	205

US Acute Lead Observations

Cardiac Perforation	1,680
Conductor Fracture	33
Extra Cardiac Stimulation	114
Failure to Capture	2,539
Failure to Sense	1,600
Impedance Out of Range	426
Insulation Breach	16
Lead Dislodgement	5,366
Oversensing	885
Unspecified Clinical Failure	26

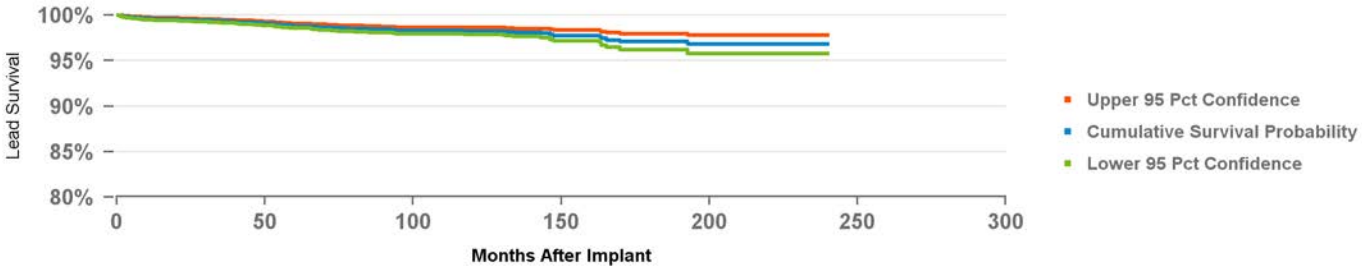
Atrial Placement

Product Surveillance Registry Results

Number of Leads Enrolled in Study	13,795
Number of Leads Active in Study	5,639
Cumulative Months of Follow-Up	638,304

Qualifying Complications 116

Cardiac Perforation	2	Impedance Out of Range	13
Conductor Fracture	13	Insulation (not further defined)	3
Extra Cardiac Stimulation	3	Lead Dislodgement	42
Failure to Capture	18	Oversensing	3
Failure to Sense	11	Other	8



Years	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	at 240 mo
%	99.6%	99.5%	99.3%	99.1%	98.8%	98.6%	98.5%	98.3%	98.3%	98.2%	98.2%	98.0%	97.7%	97.2%	97.1%	97.1%	96.8%	96.8%	96.8%	96.8%
#	8,936	7,180	6,049	5,075	4,232	3,558	2,922	2,292	1,845	1,489	1,139	911	710	547	437	358	266	175	108	60

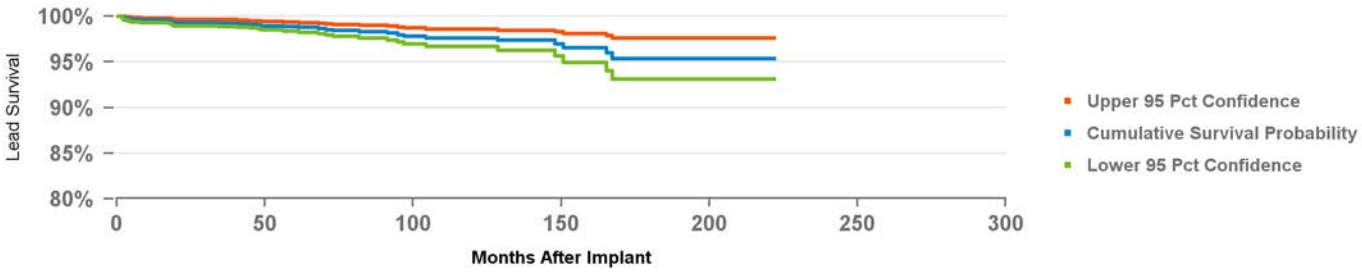
Ventricular Placement

Product Surveillance Registry Results

Number of Leads Enrolled in Study	3,408
Number of Leads Active in Study	686
Cumulative Months of Follow-Up	166,524

Qualifying Complications 37

Cardiac Perforation	1	Impedance Out of Range	4
Conductor Fracture	8	Insulation (not further defined)	1
Failure to Capture	13	Lead Dislodgement	5
Failure to Sense	1	Oversensing	2
		Other	2



Years	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	at 222 mo
%	99.5%	99.3%	99.2%	99.0%	98.8%	98.5%	98.3%	98.0%	97.6%	97.6%	97.3%	97.3%	96.5%	95.4%	95.4%	95.4%	95.4%	95.4%	95.4%
#	2,239	1,909	1,589	1,300	1,047	846	701	591	511	443	337	270	198	161	132	110	86	59	51

5086MRI CapsureFix Novus MRI

US Market Release	08Feb2011
CE Approval	21Jan2009
Registered USA Implants	207,808
Estimated Active USA Implants	126,857
Fixation Type	Active Screw In
Pace Sense Polarity	Bipolar
Steroid Indicator	Yes

US Returned Product Analysis

Conductor Fracture	116
Insulation Breach	209
Crimp/Weld/Bond	0
Other	12

US Acute Lead Observations

Cardiac Perforation	212
Conductor Fracture	4
Extra Cardiac Stimulation	18
Failure to Capture	143
Failure to Sense	29
Impedance Out of Range	9
Insulation Breach	2
Lead Dislodgement	313
Oversensing	31

Atrial Placement

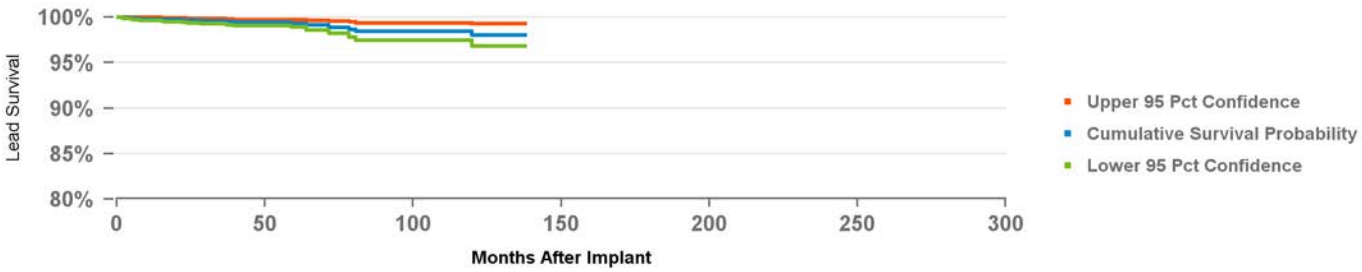
Product Surveillance Registry Results

Number of Leads Enrolled in Study	3,139
Number of Leads Active in Study	1,316
Cumulative Months of Follow-Up	145,486

Qualifying Complications

21

Conductor Fracture	3	Impedance Out of Range	0
Failure to Capture	3	Lead Dislodgement	12
		Oversensing	2
		Other	1



Years	1	2	3	4	5	6	7	8	9	10	11	at 138 mo
%	99.8%	99.6%	99.6%	99.4%	99.3%	98.9%	98.4%	98.4%	98.4%	98.0%	98.0%	98.0%
#	2,528	2,201	1,877	1,461	766	452	397	347	312	252	128	75

Ventricular Placement

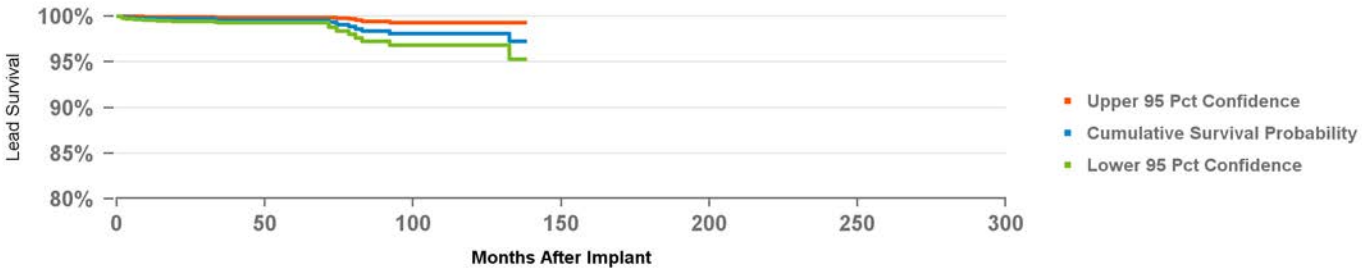
Product Surveillance Registry Results

Number of Leads Enrolled in Study	3,071
Number of Leads Active in Study	1,290
Cumulative Months of Follow-Up	143,033

Qualifying Complications

20

Conductor Fracture	3	Impedance Out of Range	2
Failure to Capture	8	Lead Dislodgement	3
Failure to Sense	1	Oversensing	2
		Other	1



Years	1	2	3	4	5	6	7	8	9	10	11	at 138 mo
%	99.7%	99.7%	99.6%	99.6%	99.6%	99.3%	98.3%	98.0%	98.0%	98.0%	98.0%	97.2%
#	2,526	2,183	1,850	1,427	735	423	375	330	295	242	125	75

5092 CapSure SP Novus

US Market Release	03Jun1998
CE Approval	25Sep1997
Registered USA Implants	141,703
Estimated Active USA Implants	29,233
Fixation Type	Tines
Pace Sense Polarity	Bipolar
Steroid Indicator	Yes

US Returned Product Analysis

Conductor Fracture	28
Insulation Breach	72
Crimp/Weld/Bond	0
Other	1

US Acute Lead Observations

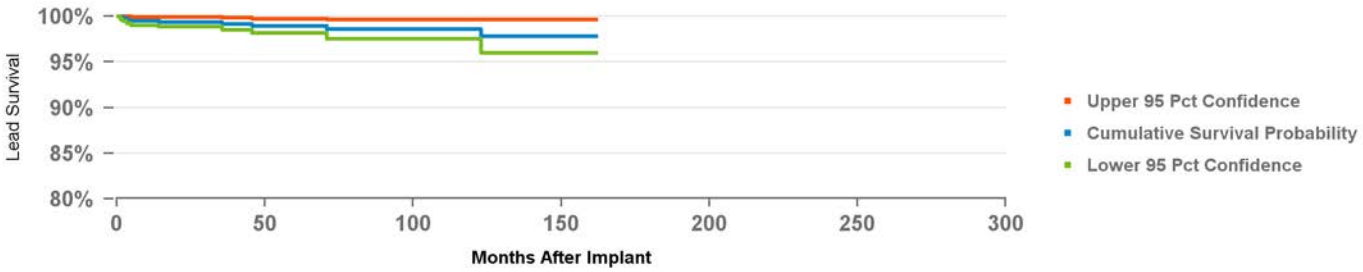
Cardiac Perforation	7
Conductor Fracture	3
Extra Cardiac Stimulation	3
Failure to Capture	49
Failure to Sense	7
Impedance Out of Range	1
Insulation Breach	3
Lead Dislodgement	72
Oversensing	1
Unspecified Clinical Failure	8

Product Surveillance Registry Results

Number of Leads Enrolled in Study	1,218
Number of Leads Active in Study	15
Cumulative Months of Follow-Up	54,677

Qualifying Complications 10

Extra Cardiac Stimulation	1	Impedance Out of Range	1
Failure to Capture	3	Lead Dislodgement	5
		Other	0



Years	1	2	3	4	5	6	7	8	9	10	11	12	13	at 162 mo
%	99.5%	99.3%	99.2%	98.9%	98.9%	98.6%	98.6%	98.6%	98.6%	98.6%	97.8%	97.8%	97.8%	97.8%
#	814	652	517	421	335	265	218	173	149	133	109	81	57	52

5554 CapSure Z Novus

US Market Release	03Jun1998
CE Approval	05Jun1997
Registered USA Implants	64,867
Estimated Active USA Implants	14,345
Fixation Type	Tines
Pace Sense Polarity	Bipolar
Steroid Indicator	Yes

US Returned Product Analysis

Conductor Fracture	24
Insulation Breach	43
Crimp/Weld/Bond	0
Other	0

US Acute Lead Observations

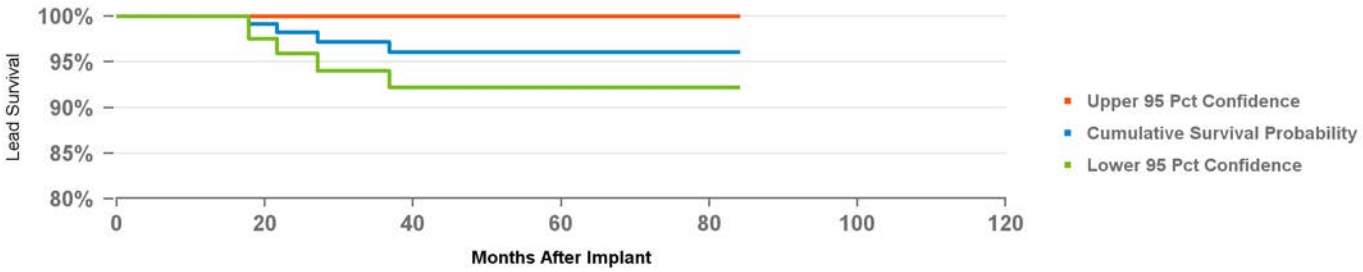
Conductor Fracture	1
Failure to Capture	31
Failure to Sense	2
Impedance Out of Range	1
Lead Dislodgement	39
Unspecified Clinical Failure	3

Product Surveillance Registry Results

Number of Leads Enrolled in Study	370
Number of Leads Active in Study	9
Cumulative Months of Follow-Up	9,444

Qualifying Complications 5

Failure to Capture	2	Impedance Out of Range	1
		Lead Dislodgement	1
		Oversensing	1
		Other	0



Years	1	2	3	4	5	6	at 84 mo
%	#####	98.2%	97.2%	96.0%	96.0%	96.0%	96.0%
#	141	107	84	77	63	55	55

5592 CapSure SP Novus

US Market Release	03Jun1998
CE Approval	25Sep1997
Registered USA Implants	37,335
Estimated Active USA Implants	9,875
Fixation Type	Tines
Pace Sense Polarity	Bipolar
Steroid Indicator	Yes

US Returned Product Analysis

Conductor Fracture	7
Insulation Breach	7
Crimp/Weld/Bond	0
Other	0

US Acute Lead Observations

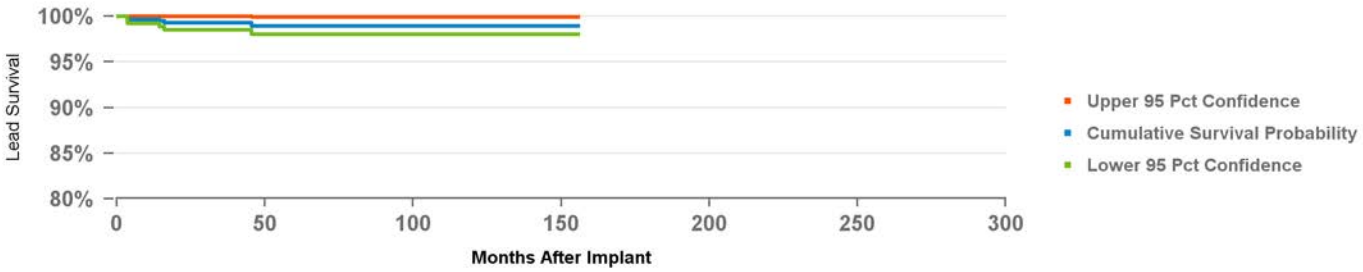
Cardiac Perforation	1
Failure to Capture	4
Failure to Sense	3
Lead Dislodgement	43
Oversensing	1
Unspecified Clinical Failure	1

Product Surveillance Registry Results

Number of Leads Enrolled in Study	722
Number of Leads Active in Study	32
Cumulative Months of Follow-Up	39,639

Qualifying Complications 5

Failure to Capture	3
Impedance Out of Range	0
Lead Dislodgement	2
Other	0



Years	1	2	3	4	5	6	7	8	9	10	11	12	at 156 mo
%	99.6%	99.3%	99.3%	98.9%	98.9%	98.9%	98.9%	98.9%	98.9%	98.9%	98.9%	98.9%	98.9%
#	523	432	351	299	249	197	169	154	132	117	99	71	51

5594 CapSure SP Novus

US Market Release	25Jun2001
CE Approval	23Mar2001
Registered USA Implants	17,611
Estimated Active USA Implants	5,509
Fixation Type	Tines
Pace Sense Polarity	Bipolar
Steroid Indicator	Yes

US Returned Product Analysis

Conductor Fracture	16
Insulation Breach	18
Crimp/Weld/Bond	0
Other	0

US Acute Lead Observations

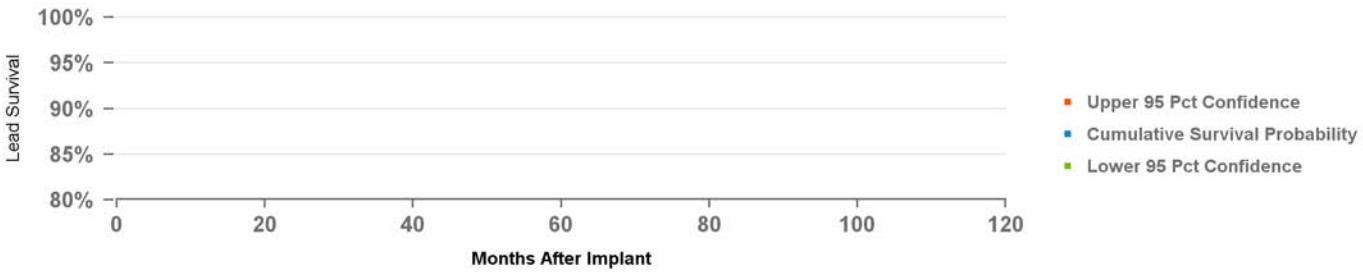
Failure to Capture	4
Lead Dislodgement	14
Unspecified Clinical Failure	2

Product Surveillance Registry Results

Number of Leads Enrolled in Study	43
Number of Leads Active in Study	11
Cumulative Months of Follow-Up	4,639

Qualifying Complications 3

Conductor Fracture	1
Failure to Capture	0
Impedance Out of Range	0
Insulation (not further defined)	1
Oversensing	1
Other	0



Years	at 0 mo
%	#####
#	

6721 Epicardial Patch

US Market Release	31Mar1994
CE Approval	01Jan1993
Registered USA Implants	3,419
Estimated Active USA Implants	862
Fixation Type	Suture
Pace Sense Polarity	n/a
Steroid Indicator	None

US Returned Product Analysis

Conductor Fracture	15
Insulation Breach	1
Crimp/Weld/Bond	0
Other	0

US Acute Lead Observations

Cardiac Perforation	1
Conductor Fracture	2
Failure to Capture	4
Failure to Sense	2
Impedance Out of Range	23
Oversensing	1

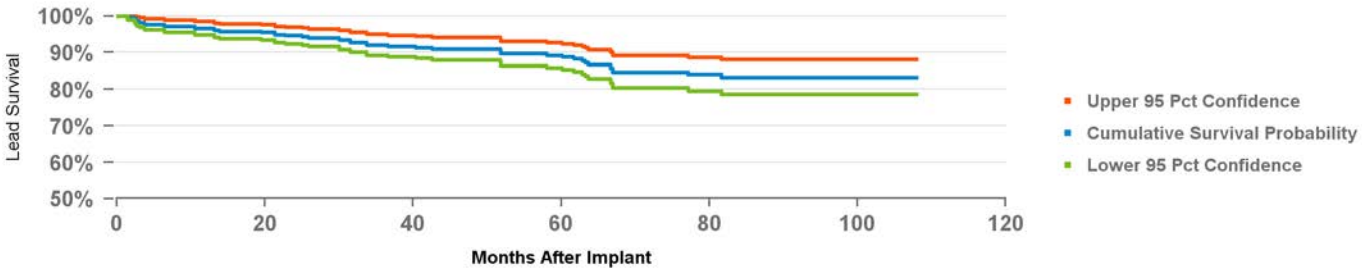
Product Surveillance Registry Results

Number of Leads Enrolled in Study	417
Number of Leads Active in Study	6
Cumulative Months of Follow-Up	24,176

Qualifying Complications

51

Conductor Fracture	21
Failure to Capture	8
Impedance Out of Range	4
Insulation (not further defined)	2
Other	16



Years	1	2	3	4	5	6	7	8	at 108 mo
%	96.6%	94.6%	92.1%	91.0%	89.3%	84.7%	83.3%	83.3%	83.3%
#	347	319	273	221	190	135	102	65	57

6930 Sprint Fidelis

US Market Release	02Sep2004
CE Approval	
Registered USA Implants	354
Estimated Active USA Implants	63
Fixation Type	Tines
Pace Sense Polarity	True Bipolar/One Coil
Steroid Indicator	Yes

US Returned Product Analysis

Conductor Fracture	5
Insulation Breach	0
Crimp/Weld/Bond	0
Other	0

US Acute Lead Observations

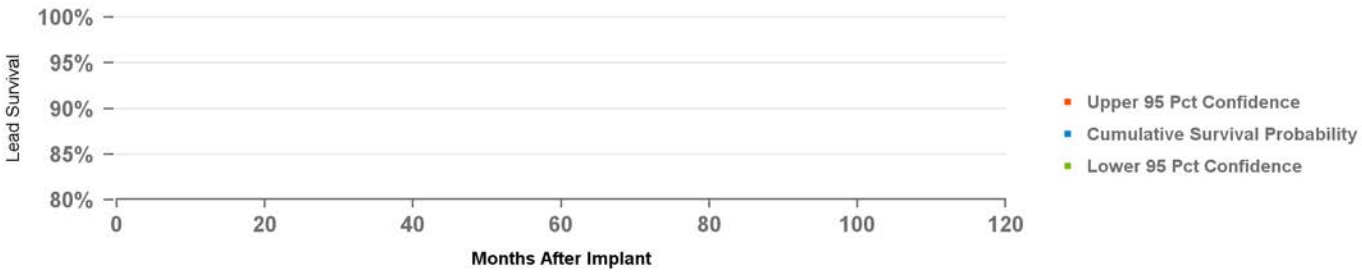
Unspecified Clinical Failure	1

Product Surveillance Registry Results

Number of Leads Enrolled in Study	4
Number of Leads Active in Study	
Cumulative Months of Follow-Up	332

Qualifying Complications

Failure to Capture	0
Impedance Out of Range	0
Other	0



Years	at 0 mo
%	#####
#	

6931 Sprint Fidelis

US Market Release	02Sep2004
CE Approval	
Registered USA Implants	8,081
Estimated Active USA Implants	1,176
Fixation Type	Active Screw In
Pace Sense Polarity	True Bipolar/One Coil
Steroid Indicator	Yes

US Returned Product Analysis

Conductor Fracture	669
Insulation Breach	1
Crimp/Weld/Bond	0
Other	5

US Acute Lead Observations

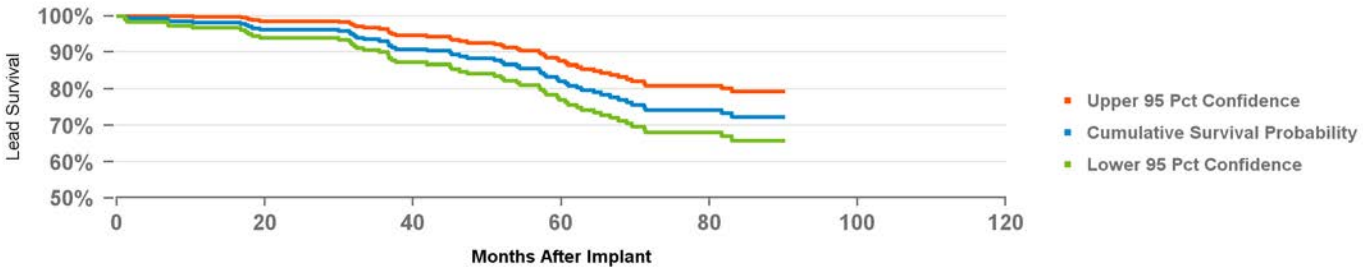
Cardiac Perforation	1
Conductor Fracture	2
Failure to Capture	1
Failure to Sense	1
Lead Dislodgement	1
Oversensing	3
Unspecified Clinical Failure	1

Product Surveillance Registry Results

Number of Leads Enrolled in Study	311
Number of Leads Active in Study	7
Cumulative Months of Follow-Up	18,091

Qualifying Complications 59

Conductor Fracture	36
Failure to Capture	3
Failure to Sense	1
Impedance Out of Range	10
Lead Dislodgement	2
Oversensing	7
Other	0



Years	1	2	3	4	5	6	7	at 90 mo
%	98.2%	96.2%	93.1%	88.3%	82.2%	74.3%	72.3%	72.3%
#	261	232	204	166	137	104	70	56

6935 Sprint Quattro Secure S

US Market Release	01Nov2008
CE Approval	31Mar2008
Registered USA Implants	67,801
Estimated Active USA Implants	39,612
Fixation Type	Active Screw In
Pace Sense Polarity	True Bipolar/One Coil
Steroid Indicator	Yes

US Returned Product Analysis

Conductor Fracture	481
Insulation Breach	13
Crimp/Weld/Bond	0
Other	44

US Acute Lead Observations

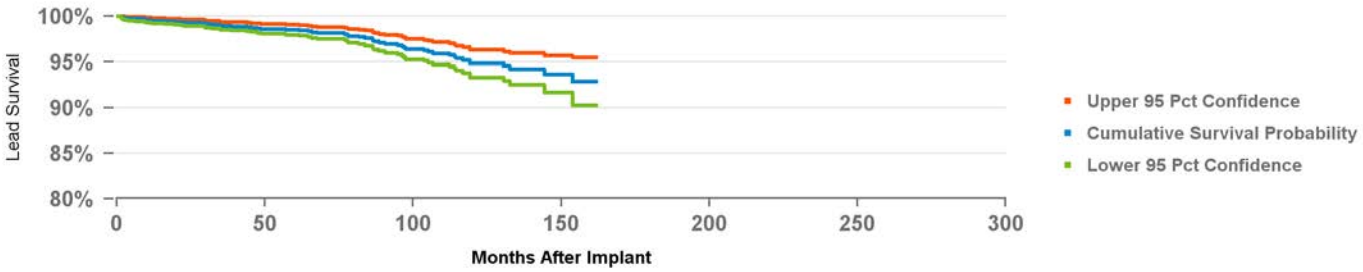
Cardiac Perforation	30
Conductor Fracture	3
Extra Cardiac Stimulation	2
Failure to Capture	39
Failure to Sense	15
Impedance Out of Range	30
Insulation Breach	1
Lead Dislodgement	68
Oversensing	68
Unspecified Clinical Failure	5

Product Surveillance Registry Results

Number of Leads Enrolled in Study	3,006
Number of Leads Active in Study	671
Cumulative Months of Follow-Up	168,788

Qualifying Complications 68

Cardiac Perforation	1	Impedance Out of Range	8
Conductor Fracture	25	Lead Dislodgement	8
Extra Cardiac Stimulation	1	Oversensing	9
Failure to Capture	8	Other	6
Failure to Sense	1	Unspecified Clinical Failure	1



Years	1	2	3	4	5	6	7	8	9	10	11	12	13	at 162 mo
%	99.5%	99.3%	98.9%	98.7%	98.5%	98.1%	97.6%	96.8%	95.9%	94.8%	94.5%	94.2%	92.8%	92.8%
#	2,443	1,997	1,639	1,342	1,139	980	817	695	587	470	316	178	90	60

6935M Sprint Quattro Secure S

US Market Release	02Aug2012
CE Approval	12Jul2012
Registered USA Implants	390,619
Estimated Active USA Implants	320,954
Fixation Type	Active Screw In
Pace Sense Polarity	True Bipolar/One Coil
Steroid Indicator	Yes

US Returned Product Analysis

Conductor Fracture	785
Insulation Breach	35
Crimp/Weld/Bond	2
Other	102

US Acute Lead Observations

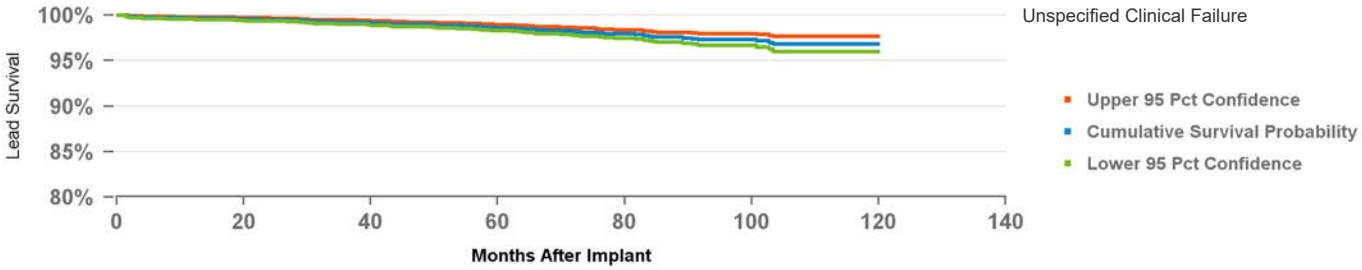
Cardiac Perforation	190
Conductor Fracture	22
Extra Cardiac Stimulation	32
Failure to Capture	453
Failure to Sense	153
Impedance Out of Range	130
Insulation Breach	3
Lead Dislodgement	663
Oversensing	350

Product Surveillance Registry Results

Number of Leads Enrolled in Study	9,745
Number of Leads Active in Study	4,568
Cumulative Months of Follow-Up	396,299

Qualifying Complications 111

Cardiac Perforation	2
Conductor Fracture	50
Extra Cardiac Stimulation	1
Failure to Capture	14
Failure to Sense	1
Impedance Out of Range	10
Insulation (not further defined)	3
Lead Dislodgement	20
Oversensing	5
Other	4
Unspecified Clinical Failure	1



Years	1	2	3	4	5	6	7	8	9	at 120 mo
%	99.7%	99.5%	99.2%	99.0%	98.6%	98.2%	97.7%	97.3%	96.8%	96.8%
#	7,128	5,483	4,436	3,648	2,963	2,343	1,589	846	390	126

6937A Transvene SVC-CS

US Market Release	06Apr2001
CE Approval	
Registered USA Implants	3,077
Estimated Active USA Implants	1,593
Fixation Type	Passive
Pace Sense Polarity	One Coil
Steroid Indicator	None

US Returned Product Analysis

Conductor Fracture	6
Insulation Breach	0
Crimp/Weld/Bond	0
Other	0

US Acute Lead Observations

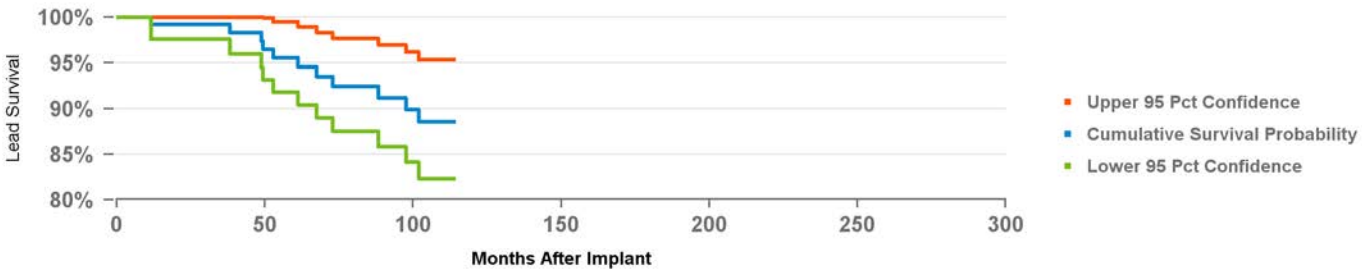
Conductor Fracture	3
Impedance Out of Range	2
Lead Dislodgement	1
Oversensing	2
Unspecified Clinical Failure	2

Product Surveillance Registry Results

Number of Leads Enrolled in Study	126
Number of Leads Active in Study	7
Cumulative Months of Follow-Up	14,412

Qualifying Complications 16

Conductor Fracture	6
Failure to Capture	0
Impedance Out of Range	2
Insulation (not further defined)	2
Lead Dislodgement	1
Other	1
Unspecified Clinical Failure	4



Years	1	2	3	4	5	6	7	8	9	at 114 mo
%	99.2%	99.2%	99.2%	98.3%	95.6%	93.5%	92.4%	91.2%	88.6%	88.6%
#	118	116	113	108	97	85	78	72	59	54

6944 Sprint Quattro

US Market Release	13Dec2000
CE Approval	05Nov1999
Registered USA Implants	44,864
Estimated Active USA Implants	11,897
Fixation Type	Tines
Pace Sense Polarity	True Bipolar/Two Coils
Steroid Indicator	Yes

US Returned Product Analysis

Conductor Fracture	234
Insulation Breach	4
Crimp/Weld/Bond	1
Other	4

US Acute Lead Observations

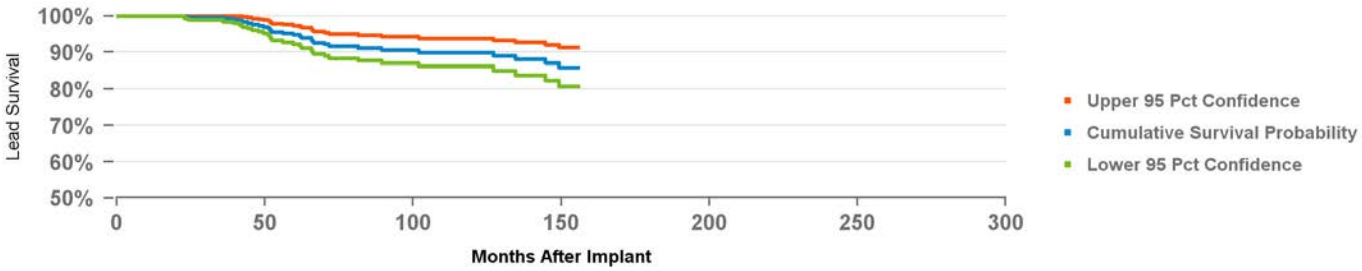
Conductor Fracture	2
Failure to Capture	17
Failure to Sense	3
Impedance Out of Range	10
Lead Dislodgement	24
Oversensing	18
Unspecified Clinical Failure	6

Product Surveillance Registry Results

Number of Leads Enrolled in Study	640
Number of Leads Active in Study	76
Cumulative Months of Follow-Up	38,347

Qualifying Complications 34

Conductor Fracture	18
Failure to Capture	4
Failure to Sense	1
Impedance Out of Range	6
Oversensing	3
Other	1
Unspecified Clinical Failure	1



Years	1	2	3	4	5	6	7	8	9	10	11	12	at 156 mo
%	#####	99.8%	99.2%	97.3%	94.8%	91.7%	91.1%	90.6%	89.9%	89.9%	89.1%	88.2%	85.9%
#	502	418	352	290	228	191	165	146	132	116	103	83	59

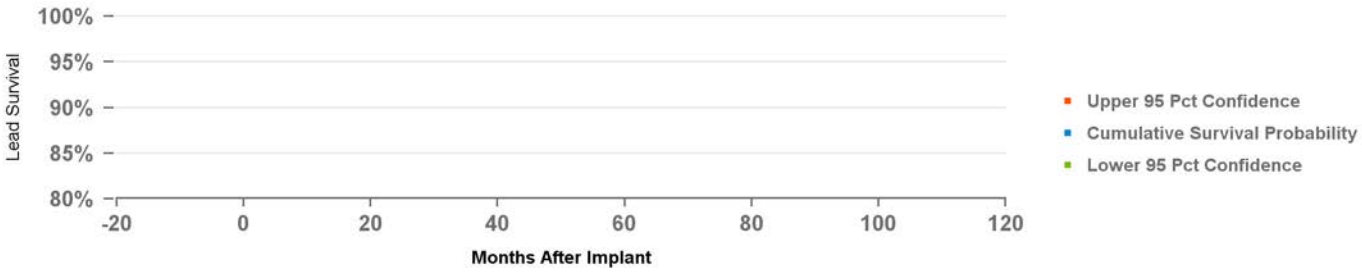
6946M Sprint Quattro

US Market Release	05Jan2016
CE Approval	12Sep2013
Registered USA Implants	4,243
Estimated Active USA Implants	3,674
Fixation Type	Tines
Pace Sense Polarity	True Bipolar/Two Coils
Steroid Indicator	Yes

US Returned Product Analysis

US Acute Lead Observations

Cardiac Perforation	1
Failure to Capture	5
Failure to Sense	2
Impedance Out of Range	1
Lead Dislodgement	8
Oversensing	6



Years	at mo
%	
#	

6947 Sprint Quattro Secure

US Market Release	12Nov2001
CE Approval	04Oct2001
Registered USA Implants	375,589
Estimated Active USA Implants	125,490
Fixation Type	Active Screw In
Pace Sense Polarity	True Bipolar/Two Coils
Steroid Indicator	Yes

US Returned Product Analysis

Conductor Fracture	1,414
Insulation Breach	103
Crimp/Weld/Bond	4
Other	197

US Acute Lead Observations

Cardiac Perforation	29
Conductor Fracture	26
Extra Cardiac Stimulation	2
Failure to Capture	83
Failure to Sense	36
Impedance Out of Range	61
Insulation Breach	4
Lead Dislodgement	124
Oversensing	141
Unspecified Clinical Failure	20

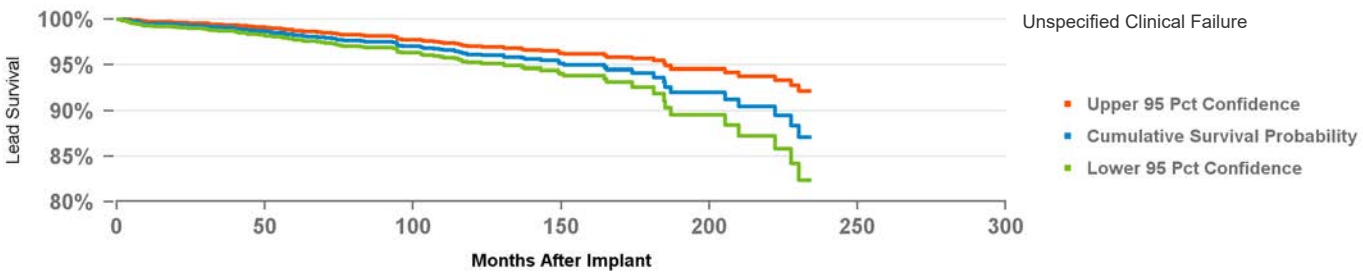
Product Surveillance Registry Results

Number of Leads Enrolled in Study	4,583
Number of Leads Active in Study	570
Cumulative Months of Follow-Up	298,935

Qualifying Complications

105

Cardiac Perforation	1
Conductor Fracture	42
Failure to Capture	8
Failure to Sense	2
Impedance Out of Range	13
Insulation (not further defined)	6
Lead Dislodgement	5
Oversensing	21
Other	4
Unspecified Clinical Failure	3



Years	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	at 234 mo
%	99.5%	99.3%	99.0%	98.7%	98.2%	97.9%	97.5%	97.1%	96.7%	96.1%	95.8%	95.5%	95.0%	94.5%	94.1%	92.0%	92.0%	90.5%	88.4%	87.1%
#	3,302	2,902	2,548	2,259	2,025	1,787	1,541	1,380	1,233	1,073	885	679	514	332	204	146	120	100	78	58

6947M Sprint Quattro Secure

US Market Release	13Feb2012
CE Approval	12Mar2010
Registered USA Implants	137,519
Estimated Active USA Implants	94,732
Fixation Type	Active Screw In
Pace Sense Polarity	True Bipolar/Two Coils
Steroid Indicator	Yes

US Returned Product Analysis

Conductor Fracture	257
Insulation Breach	15
Crimp/Weld/Bond	1
Other	37

US Acute Lead Observations

Cardiac Perforation	40
Conductor Fracture	15
Extra Cardiac Stimulation	12
Failure to Capture	124
Failure to Sense	47
Impedance Out of Range	36
Insulation Breach	1
Lead Dislodgement	241
Oversensing	86

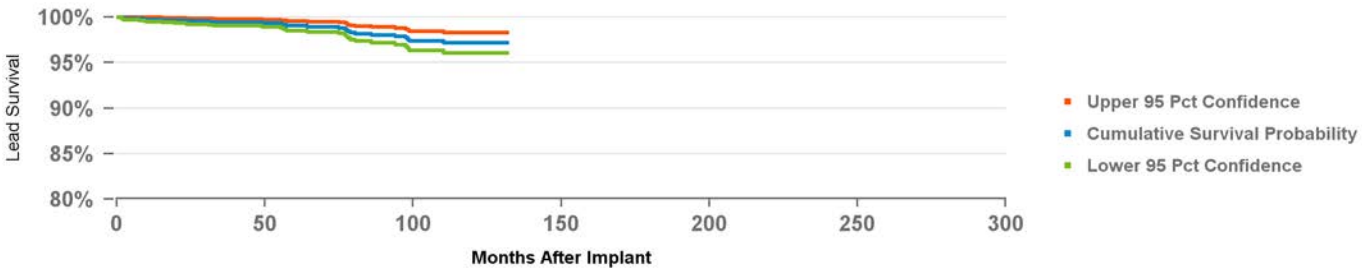
Product Surveillance Registry Results

Number of Leads Enrolled in Study	2,410
Number of Leads Active in Study	671
Cumulative Months of Follow-Up	132,529

Qualifying Complications

28

Conductor Fracture	15	Impedance Out of Range	1
Failure to Capture	4	Lead Dislodgement	1
Failure to Sense	4	Oversensing	2
		Other	1



Years	1	2	3	4	5	6	7	8	9	10	at 132 mo
%	99.7%	99.5%	99.4%	99.4%	99.0%	98.9%	98.2%	97.9%	97.4%	97.1%	97.1%
#	1,862	1,554	1,365	1,163	1,003	848	713	595	476	315	81

6948 Sprint Fidelis

US Market Release	02Sep2004
CE Approval	
Registered USA Implants	10,381
Estimated Active USA Implants	1,640
Fixation Type	Tines
Pace Sense Polarity	True Bipolar/Two Coils
Steroid Indicator	Yes

US Returned Product Analysis

Conductor Fracture	218
Insulation Breach	3
Crimp/Weld/Bond	0
Other	6

US Acute Lead Observations

Conductor Fracture	2
Failure to Capture	7
Lead Dislodgement	7
Oversensing	1
Unspecified Clinical Failure	3

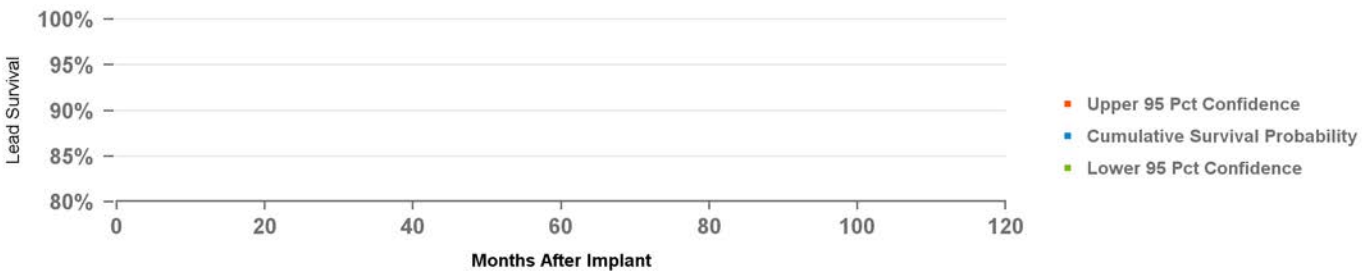
Product Surveillance Registry Results

Number of Leads Enrolled in Study	40
Number of Leads Active in Study	2
Cumulative Months of Follow-Up	2,314

Qualifying Complications

5

Conductor Fracture	4	Impedance Out of Range	1
Failure to Capture	0	Other	0



Years	at 0 mo
%	#####
#	

6949 Sprint Fidelis

US Market Release	02Sep2004
CE Approval	
Registered USA Implants	186,211
Estimated Active USA Implants	24,186
Fixation Type	Active Screw In
Pace Sense Polarity	True Bipolar/Two Coils
Steroid Indicator	Yes

US Returned Product Analysis

Conductor Fracture	8,168
Insulation Breach	37
Crimp/Weld/Bond	3
Other	119

US Acute Lead Observations

Cardiac Perforation	10
Conductor Fracture	51
Failure to Capture	31
Failure to Sense	19
Impedance Out of Range	20
Insulation Breach	5
Lead Dislodgement	22
Oversensing	37
Unspecified Clinical Failure	24

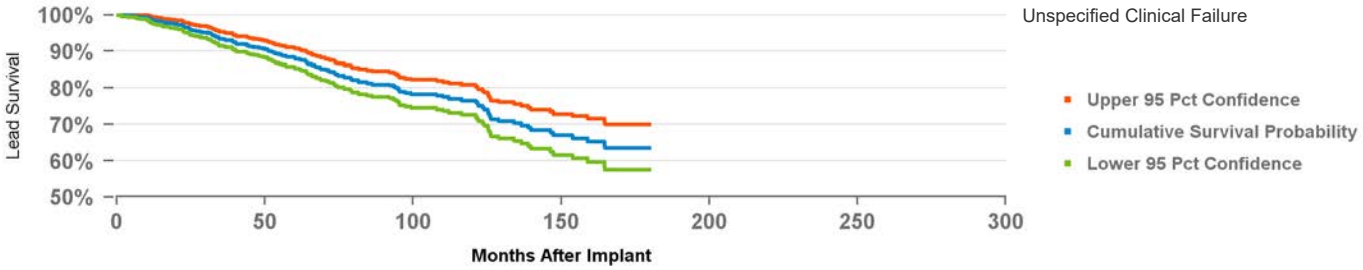
Product Surveillance Registry Results

Number of Leads Enrolled in Study	986
Number of Leads Active in Study	30
Cumulative Months of Follow-Up	57,902

Qualifying Complications

135

Conductor Fracture	77
Failure to Capture	5
Failure to Sense	6
Impedance Out of Range	19
Insulation (not further defined)	2
Lead Dislodgement	1
Oversensing	21
Other	3
Unspecified Clinical Failure	1



Years	1	2	3	4	5	6	7	8	9	10	11	12	13	14	at 180 mo
%	98.6%	96.5%	93.4%	91.0%	88.2%	84.5%	81.6%	79.0%	78.0%	76.6%	70.9%	68.5%	66.2%	63.5%	63.5%
#	719	626	532	458	392	343	281	236	187	152	125	96	79	65	55

6996 Sub-Q Lead

US Market Release	11Jun2001
CE Approval	19Dec1997
Registered USA Implants	5,747
Estimated Active USA Implants	2,595
Fixation Type	Suture on Anchor Sleeve
Pace Sense Polarity	One Coil
Steroid Indicator	None

US Returned Product Analysis

Conductor Fracture	37
Insulation Breach	0
Crimp/Weld/Bond	0
Other	0

US Acute Lead Observations

Cardiac Perforation	1
Failure to Capture	1
Impedance Out of Range	18
Insulation Breach	1
Lead Dislodgement	3
Oversensing	1

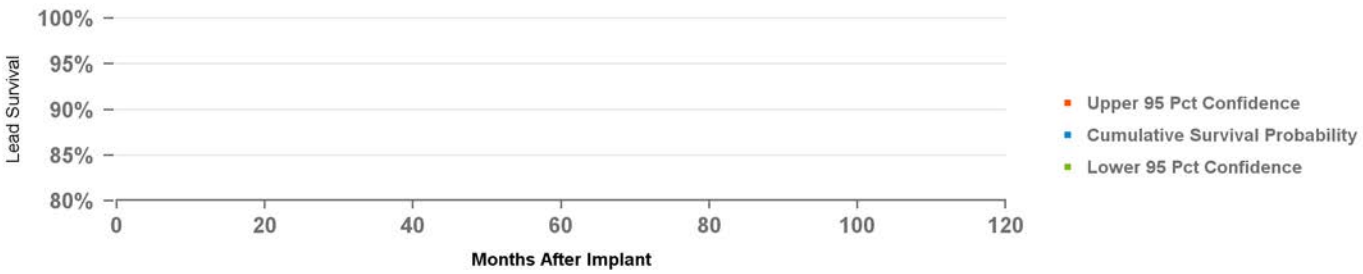
Product Surveillance Registry Results

Number of Leads Enrolled in Study	55
Number of Leads Active in Study	3
Cumulative Months of Follow-Up	2,577

Qualifying Complications

4

Conductor Fracture	1
Failure to Capture	0
Impedance Out of Range	3
Other	0



Years	at 0 mo
%	#####
#	

2187 Attain LV

US Market Release	28Aug2001
CE Approval	
Registered USA Implants	11,921
Estimated Active USA Implants	980
Fixation Type	Distal Continous Curve
Pace Sense Polarity	Unipolar
Steroid Indicator	None

US Returned Product Analysis

Conductor Fracture	1
Insulation Breach	3
Crimp/Weld/Bond	0
Other	3

US Acute Lead Observations

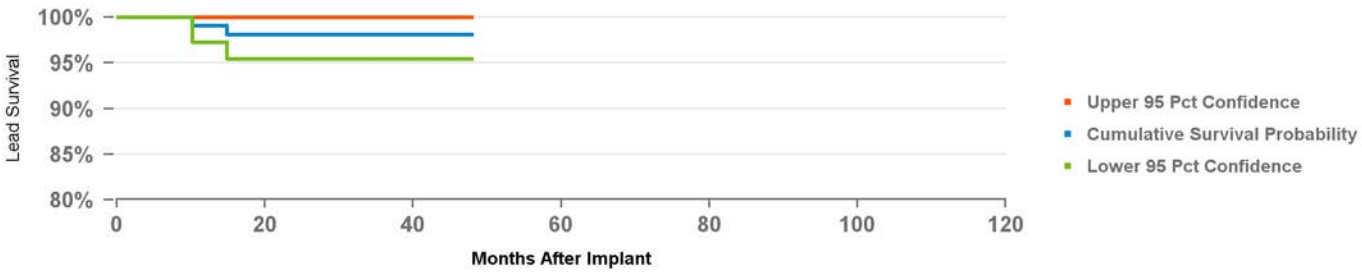
Extra Cardiac Stimulation	1
Failure to Capture	3
Failure to Sense	1
Lead Dislodgement	9

Product Surveillance Registry Results

Number of Leads Enrolled in Study	140
Number of Leads Active in Study	4
Cumulative Months of Follow-Up	7,229

Qualifying Complications 3

Failure to Capture	3	Impedance Out of Range	0
		Other	0



Years	1	2	3	at 48 mo
%	99.1%	98.0%	98.0%	98.0%
#	101	85	65	52

4193 Attain OTW

US Market Release	03May2002
CE Approval	22Dec2000
Registered USA Implants	100,664
Estimated Active USA Implants	12,199
Fixation Type	Double Curve
Pace Sense Polarity	Unipolar
Steroid Indicator	Yes

US Returned Product Analysis

Conductor Fracture	91
Insulation Breach	31
Crimp/Weld/Bond	0
Other	15

US Acute Lead Observations

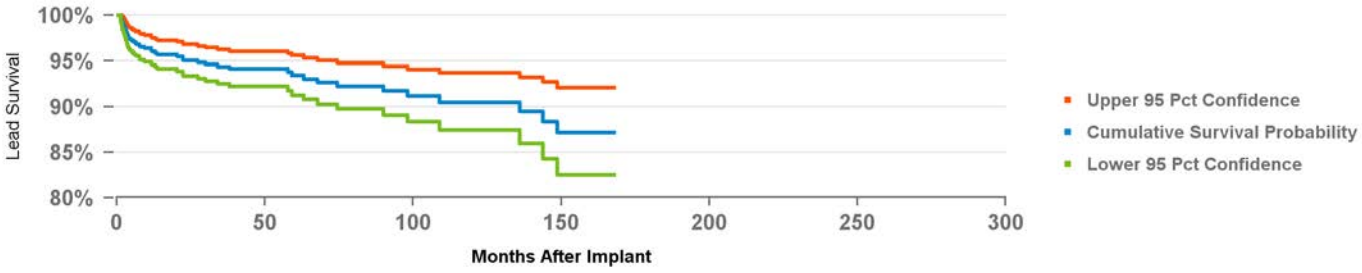
Extra Cardiac Stimulation	18
Failure to Capture	11
Lead Dislodgement	45
Oversensing	1
Unspecified Clinical Failure	2

Product Surveillance Registry Results

Number of Leads Enrolled in Study	805
Number of Leads Active in Study	20
Cumulative Months of Follow-Up	42,539

Qualifying Complications 52

Conductor Fracture	1	Impedance Out of Range	2
Extra Cardiac Stimulation	10	Lead Dislodgement	16
Failure to Capture	20	Other	0
		Unspecified Clinical Failure	3



Years	1	2	3	4	5	6	7	8	9	10	11	12	13	at 168 mo
%	96.0%	95.1%	94.4%	94.1%	93.4%	92.6%	92.2%	91.7%	91.2%	90.5%	90.5%	88.4%	87.2%	87.2%
#	569	444	376	304	252	228	193	171	139	118	97	78	63	51

4194 Attain OTW

US Market Release	24Aug2004
CE Approval	14Jul2003
Registered USA Implants	114,258
Estimated Active USA Implants	28,634
Fixation Type	Double Curve
Pace Sense Polarity	Bipolar
Steroid Indicator	Yes

US Returned Product Analysis

Conductor Fracture	48
Insulation Breach	166
Crimp/Weld/Bond	0
Other	2

US Acute Lead Observations

Cardiac Perforation	2
Conductor Fracture	3
Extra Cardiac Stimulation	49
Failure to Capture	42
Impedance Out of Range	9
Lead Dislodgement	153
Oversensing	2
Unspecified Clinical Failure	4

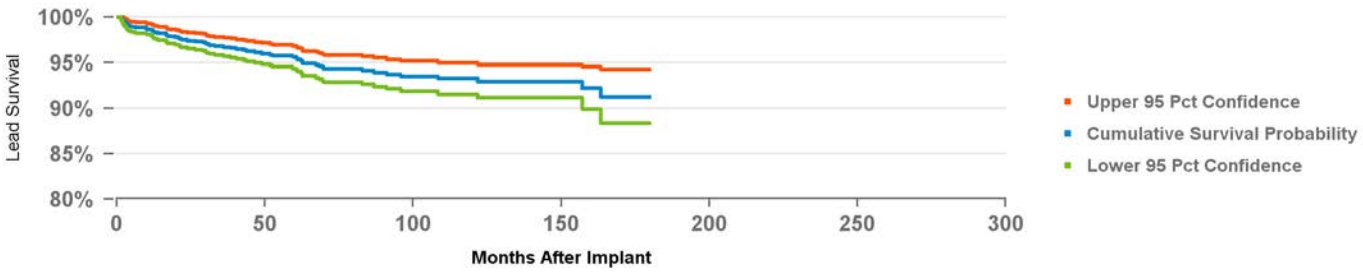
Product Surveillance Registry Results

Number of Leads Enrolled in Study	1,654
Number of Leads Active in Study	156
Cumulative Months of Follow-Up	99,897

Qualifying Complications

68

Conductor Fracture	2
Extra Cardiac Stimulation	11
Failure to Capture	22
Impedance Out of Range	0
Insulation (ESC)	1
Insulation (not further defined)	2
Lead Dislodgement	30
Other	0



Years	1	2	3	4	5	6	7	8	9	10	11	12	13	14	at 180 mo
%	98.6%	97.4%	96.7%	96.1%	95.6%	94.3%	94.1%	93.5%	93.5%	93.3%	92.9%	92.9%	92.9%	91.3%	91.3%
#	1,238	1,045	897	769	697	617	504	429	365	310	239	178	126	84	58

4195 Attain StarFix

US Market Release	15Aug2008
CE Approval	13May2005
Registered USA Implants	17,444
Estimated Active USA Implants	6,250
Fixation Type	Deployable Lobe Fixation
Pace Sense Polarity	Unipolar
Steroid Indicator	Yes

US Returned Product Analysis

Conductor Fracture	10
Insulation Breach	3
Crimp/Weld/Bond	0
Other	2

US Acute Lead Observations

Extra Cardiac Stimulation	30
Failure to Capture	21
Impedance Out of Range	4
Lead Dislodgement	30
Unspecified Clinical Failure	1

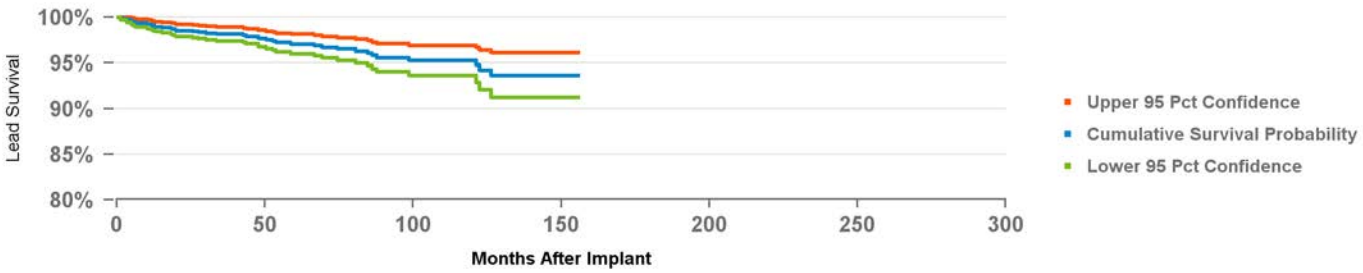
Product Surveillance Registry Results

Number of Leads Enrolled in Study	1,486
Number of Leads Active in Study	137
Cumulative Months of Follow-Up	87,698

Qualifying Complications

45

Conductor Fracture	4
Extra Cardiac Stimulation	18
Failure to Capture	9
Impedance Out of Range	2
Insulation (not further defined)	6
Lead Dislodgement	5
Other	1



Years	1	2	3	4	5	6	7	8	9	10	11	12	at 156 mo
%	99.1%	98.5%	98.1%	97.6%	97.0%	96.7%	96.3%	95.6%	95.2%	95.2%	93.7%	93.7%	93.7%
#	1,243	1,072	924	747	620	509	414	321	257	197	139	89	59

4196 Attain Ability

US Market Release	15May2009
CE Approval	24Jul2007
Registered USA Implants	68,956
Estimated Active USA Implants	27,779
Fixation Type	Double Curve
Pace Sense Polarity	Bipolar
Steroid Indicator	Yes

US Returned Product Analysis

Conductor Fracture	26
Insulation Breach	2
Crimp/Weld/Bond	0
Other	9

US Acute Lead Observations

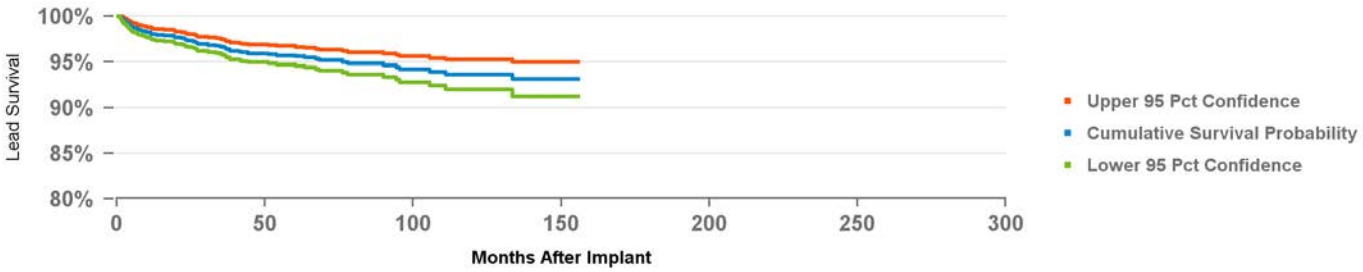
Cardiac Perforation	3
Conductor Fracture	2
Extra Cardiac Stimulation	98
Failure to Capture	67
Failure to Sense	1
Impedance Out of Range	12
Insulation Breach	1
Lead Dislodgement	227
Oversensing	1
Unspecified Clinical Failure	2

Product Surveillance Registry Results

Number of Leads Enrolled in Study	2,323
Number of Leads Active in Study	219
Cumulative Months of Follow-Up	119,377

Qualifying Complications 87

Conductor Fracture	3	Impedance Out of Range	2
Extra Cardiac Stimulation	17	Insulation (not further defined)	1
Failure to Capture	37	Lead Dislodgement	23
		Other	4



Years	1	2	3	4	5	6	7	8	9	10	11	12	at 156 mo
%	98.0%	97.3%	96.6%	95.9%	95.7%	95.2%	94.8%	94.2%	93.9%	93.6%	93.6%	93.1%	93.1%
#	1,887	1,499	1,192	964	792	636	495	410	339	262	194	134	51

4296 Attain Ability Plus

US Market Release	01Apr2011
CE Approval	18Dec2009
Registered USA Implants	35,176
Estimated Active USA Implants	17,245
Fixation Type	Double Curve
Pace Sense Polarity	Dual Electrodes
Steroid Indicator	Yes

US Returned Product Analysis

Conductor Fracture	4
Insulation Breach	0
Crimp/Weld/Bond	2
Other	4

US Acute Lead Observations

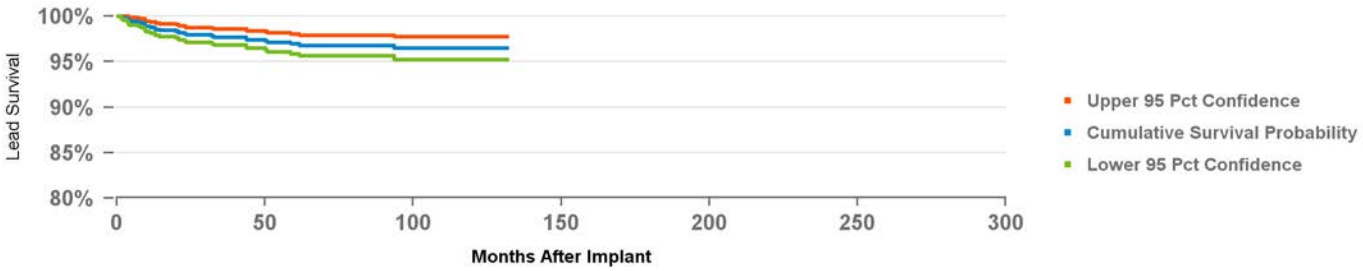
Cardiac Perforation	2
Conductor Fracture	1
Extra Cardiac Stimulation	63
Failure to Capture	36
Impedance Out of Range	11
Insulation Breach	4
Lead Dislodgement	120

Product Surveillance Registry Results

Number of Leads Enrolled in Study	1,471
Number of Leads Active in Study	244
Cumulative Months of Follow-Up	77,394

Qualifying Complications 35

Extra Cardiac Stimulation	12	Impedance Out of Range	0
Failure to Capture	9	Lead Dislodgement	13
		Other	1



Years	1	2	3	4	5	6	7	8	9	10	at 132 mo
%	98.7%	97.9%	97.7%	97.4%	96.9%	96.7%	96.7%	96.5%	96.5%	96.5%	96.5%
#	1,163	940	773	657	552	472	402	327	266	154	56

4298 Attain Performa

US Market Release	01Aug2014
CE Approval	01Jan2013
Registered USA Implants	118,671
Estimated Active USA Implants	91,583
Fixation Type	Double Curve
Pace Sense Polarity	Quadripolar
Steroid Indicator	Yes

US Returned Product Analysis

Conductor Fracture	7
Insulation Breach	0
Crimp/Weld/Bond	0
Other	27

US Acute Lead Observations

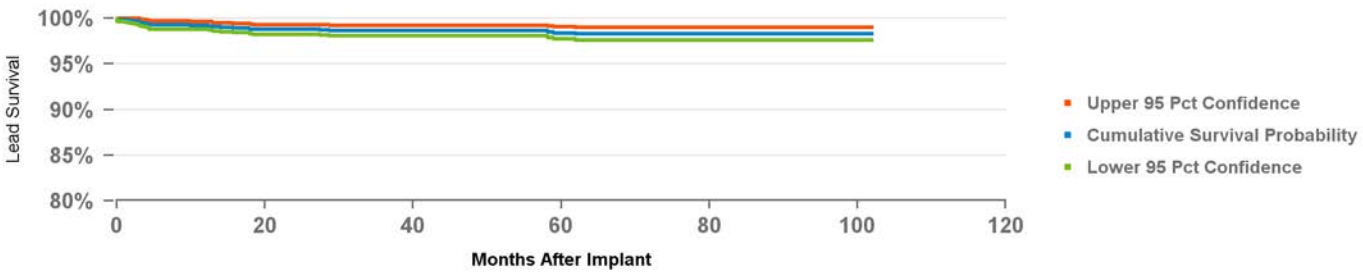
Cardiac Perforation	7
Conductor Fracture	1
Extra Cardiac Stimulation	233
Failure to Capture	168
Failure to Sense	1
Impedance Out of Range	44
Lead Dislodgement	256

Product Surveillance Registry Results

Number of Leads Enrolled in Study	2,262
Number of Leads Active in Study	850
Cumulative Months of Follow-Up	107,609

Qualifying Complications 28

Extra Cardiac Stimulation	5	Impedance Out of Range	0
Failure to Capture	5	Lead Dislodgement	15
		Other	3



Years	1	2	3	4	5	6	7	8	at 102 mo
%	99.2%	98.7%	98.6%	98.6%	98.4%	98.2%	98.2%	98.2%	98.2%
#	1,882	1,595	1,363	1,120	804	589	378	176	85

4396 Attain Ability Straight

US Market Release	31Mar2011
CE Approval	18Dec2009
Registered USA Implants	8,398
Estimated Active USA Implants	4,369
Fixation Type	Tines
Pace Sense Polarity	Dual Electrodes
Steroid Indicator	Yes

US Returned Product Analysis

Conductor Fracture	5
Insulation Breach	1
Crimp/Weld/Bond	0
Other	0

US Acute Lead Observations

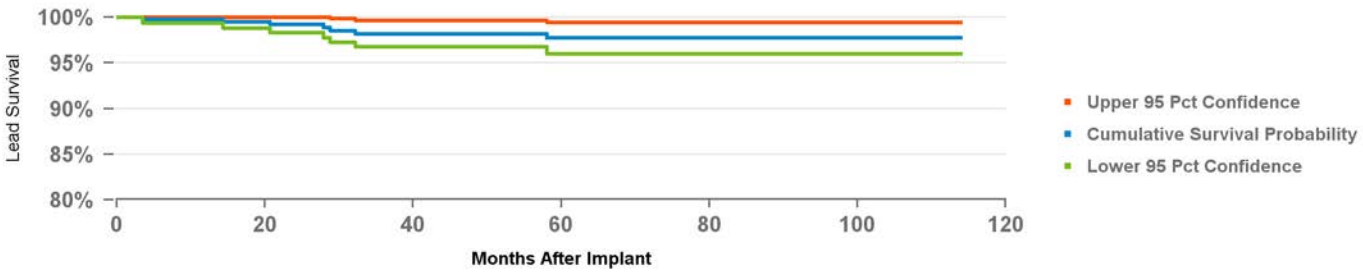
Cardiac Perforation	1
Conductor Fracture	2
Extra Cardiac Stimulation	21
Failure to Capture	14
Lead Dislodgement	35

Product Surveillance Registry Results

Number of Leads Enrolled in Study	483
Number of Leads Active in Study	86
Cumulative Months of Follow-Up	25,655

Qualifying Complications 10

Extra Cardiac Stimulation	1	Impedance Out of Range	0
Failure to Capture	4	Insulation (not further defined)	1
		Lead Dislodgement	4
		Other	0



Years	1	2	3	4	5	6	7	8	9	at 114 mo
%	99.8%	99.2%	98.2%	98.2%	97.7%	97.7%	97.7%	97.7%	97.7%	97.7%
#	383	306	268	233	196	155	124	103	81	61

4398 Attain Performa Straight

US Market Release	10Dec2014
CE Approval	01Jan2013
Registered USA Implants	40,945
Estimated Active USA Implants	32,644
Fixation Type	Tines
Pace Sense Polarity	Quadripolar
Steroid Indicator	Yes

US Returned Product Analysis

Conductor Fracture	4
Insulation Breach	0
Crimp/Weld/Bond	0
Other	7

US Acute Lead Observations

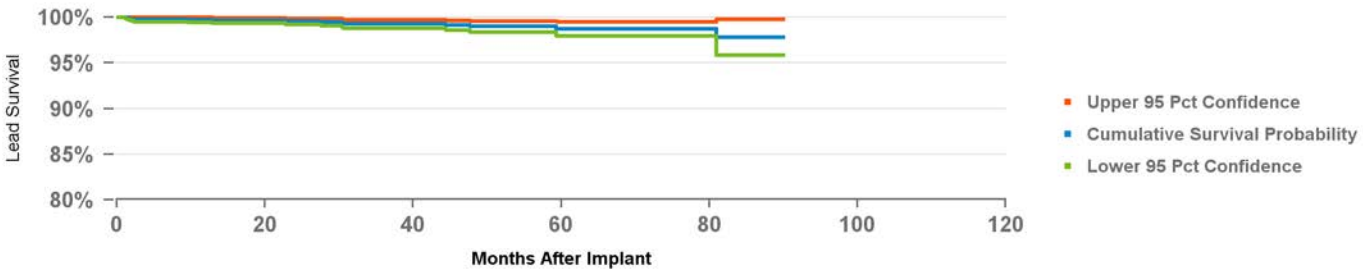
Cardiac Perforation	8
Conductor Fracture	1
Extra Cardiac Stimulation	109
Failure to Capture	77
Impedance Out of Range	13
Lead Dislodgement	41

Product Surveillance Registry Results

Number of Leads Enrolled in Study	2,085
Number of Leads Active in Study	1,135
Cumulative Months of Follow-Up	71,485

Qualifying Complications 17

Extra Cardiac Stimulation	1	Impedance Out of Range	1
Failure to Capture	7	Lead Dislodgement	8
		Other	0



Years	1	2	3	4	5	6	7	at 90 mo
%	99.7%	99.5%	99.3%	99.0%	98.7%	98.7%	97.8%	97.8%
#	1,594	1,231	916	639	368	178	85	52

4598 Attain Performa S

US Market Release	10Dec2014
CE Approval	01Jan2013
Registered USA Implants	75,744
Estimated Active USA Implants	61,223
Fixation Type	S-shape
Pace Sense Polarity	Quadripolar
Steroid Indicator	Yes

US Returned Product Analysis

Conductor Fracture	6
Insulation Breach	0
Crimp/Weld/Bond	0
Other	14

US Acute Lead Observations

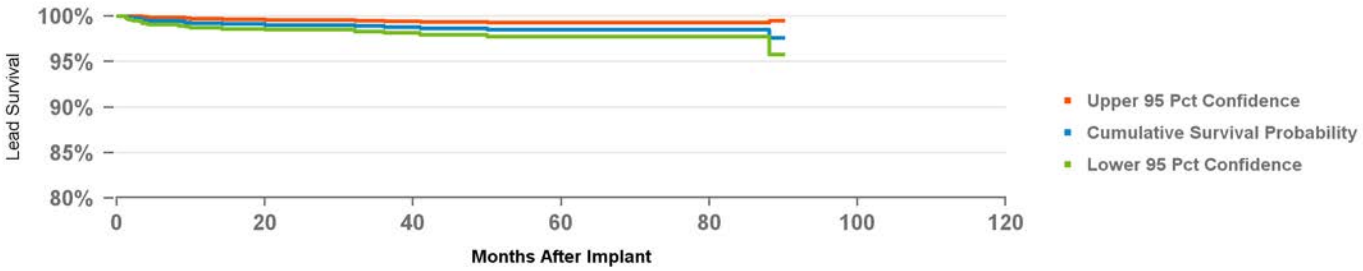
Cardiac Perforation	11
Conductor Fracture	2
Extra Cardiac Stimulation	138
Failure to Capture	100
Impedance Out of Range	36
Lead Dislodgement	86
Oversensing	1

Product Surveillance Registry Results

Number of Leads Enrolled in Study	1,375
Number of Leads Active in Study	538
Cumulative Months of Follow-Up	61,197

Qualifying Complications 17

Extra Cardiac Stimulation	3	Impedance Out of Range	0
Failure to Capture	1	Lead Dislodgement	12
Failure to Sense	1	Other	0



Years	1	2	3	4	5	6	7	at 90 mo
%	99.2%	99.0%	98.9%	98.6%	98.5%	98.5%	98.5%	97.6%
#	1,141	959	793	657	456	263	138	95

4798 Attain Stability Quad

US Market Release	03Jun2019
CE Approval	24Apr2017
Registered USA Implants	49,098
Estimated Active USA Implants	45,864
Fixation Type	Non-electrically Active Side Fixation
Pace Sense Polarity	Quadripolar
Steroid Indicator	Yes

US Returned Product Analysis

Conductor Fracture	1
Insulation Breach	0
Crimp/Weld/Bond	0
Other	14

US Acute Lead Observations

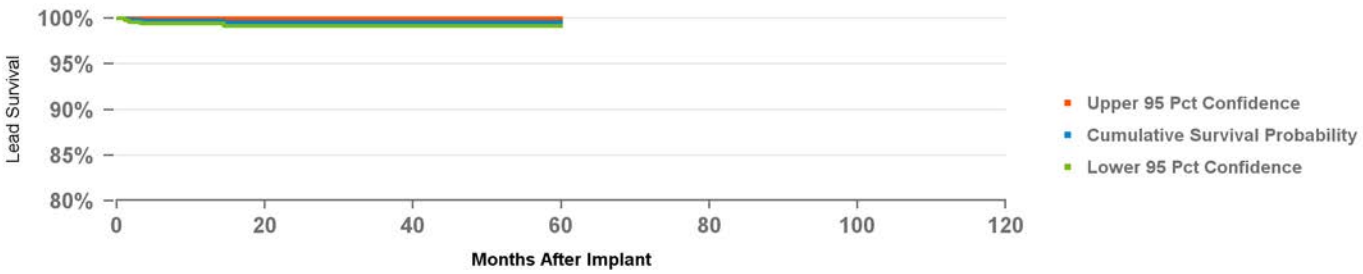
Cardiac Perforation	7
Conductor Fracture	2
Extra Cardiac Stimulation	88
Failure to Capture	99
Impedance Out of Range	37
Lead Dislodgement	101
Oversensing	1

Product Surveillance Registry Results

Number of Leads Enrolled in Study	1,357
Number of Leads Active in Study	969
Cumulative Months of Follow-Up	23,538

Qualifying Complications 6

Conductor Fracture	1	Impedance Out of Range	0
Extra Cardiac Stimulation	2	Lead Dislodgement	2
Failure to Capture	1	Other	0



Years	1	2	3	4	at 60 mo
%	99.7%	99.6%	99.6%	99.6%	99.6%
#	744	390	175	103	52

4965 CapSure Epi

US Market Release	06Sep1996
CE Approval	01Jan1993
Registered USA Implants	24,263
Estimated Active USA Implants	6,865
Fixation Type	Suture
Pace Sense Polarity	Unipolar
Steroid Indicator	Yes

US Returned Product Analysis

Conductor Fracture	298
Insulation Breach	64
Crimp/Weld/Bond	1
Other	0

US Acute Lead Observations

Cardiac Perforation	1
Conductor Fracture	1
Failure to Capture	11
Failure to Sense	8
Impedance Out of Range	21
Oversensing	2
Unspecified Clinical Failure	3

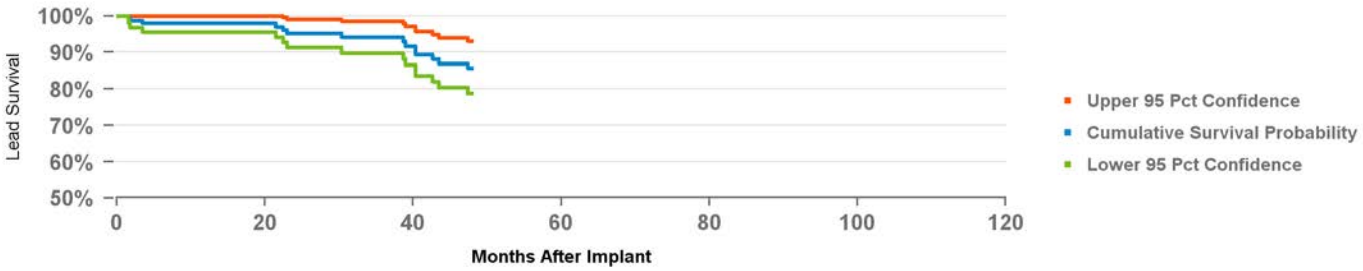
Product Surveillance Registry Results

Number of Leads Enrolled in Study	234
Number of Leads Active in Study	3
Cumulative Months of Follow-Up	7,500

Qualifying Complications

18

Conductor Fracture	10
Failure to Capture	4
Failure to Sense	1
Impedance Out of Range	0
Insulation (not further defined)	1
Oversensing	2
Other	0



Years	1	2	3	at 48 mo
%	97.9%	95.1%	94.0%	85.6%
#	118	100	82	60

4968 CapSure Epi

US Market Release	16Sep1999
CE Approval	21Apr1998
Registered USA Implants	62,709
Estimated Active USA Implants	34,288
Fixation Type	Suture
Pace Sense Polarity	Bipolar
Steroid Indicator	Yes

US Returned Product Analysis

Conductor Fracture	150
Insulation Breach	84
Crimp/Weld/Bond	0
Other	1

US Acute Lead Observations

Cardiac Perforation	1
Conductor Fracture	4
Extra Cardiac Stimulation	7
Failure to Capture	97
Failure to Sense	12
Impedance Out of Range	21
Insulation Breach	1
Lead Dislodgement	8
Oversensing	31

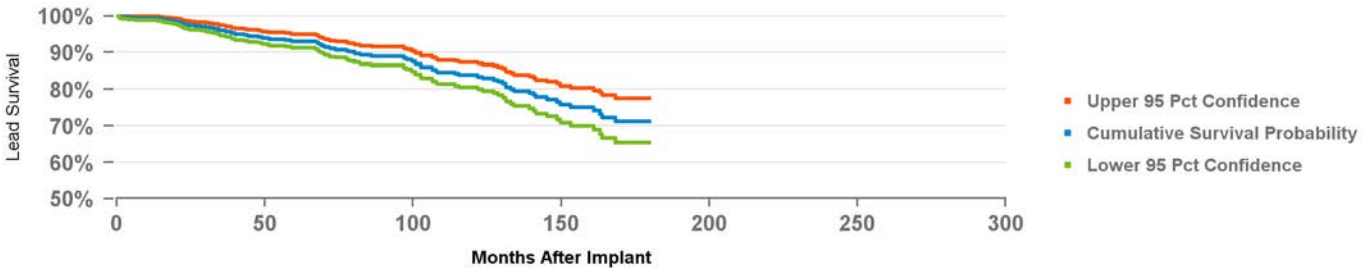
Product Surveillance Registry Results

Number of Leads Enrolled in Study	1,053
Number of Leads Active in Study	186
Cumulative Months of Follow-Up	70,996

Qualifying Complications

106

Conductor Fracture	33
Extra Cardiac Stimulation	2
Failure to Capture	29
Failure to Sense	3
Impedance Out of Range	5
Insulation (not further defined)	4
Lead Dislodgement	1
Oversensing	26
Other	3



Years	1	2	3	4	5	6	7	8	9	10	11	12	13	14	at 180 mo
%	99.4%	97.5%	96.0%	94.3%	93.1%	91.1%	89.3%	89.1%	85.0%	83.9%	80.6%	77.9%	75.1%	72.3%	71.3%
#	824	742	662	572	509	434	384	321	239	198	162	122	88	69	53

5071 Screw-in

US Market Release	03Dec1992
CE Approval	01Jan1993
Registered USA Implants	57,450
Estimated Active USA Implants	12,485
Fixation Type	Fixed Screw
Pace Sense Polarity	Unipolar
Steroid Indicator	None

US Returned Product Analysis

Conductor Fracture	33
Insulation Breach	2
Crimp/Weld/Bond	0
Other	1

US Acute Lead Observations

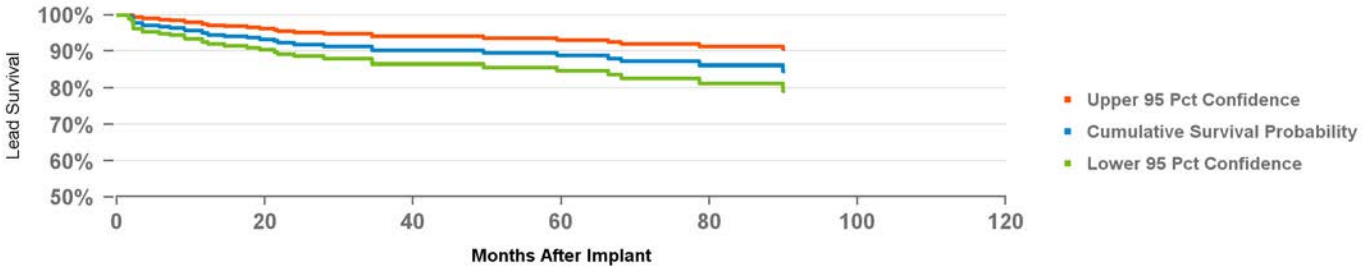
Cardiac Perforation	2
Extra Cardiac Stimulation	6
Failure to Capture	110
Failure to Sense	4
Impedance Out of Range	14
Lead Dislodgement	4
Oversensing	2
Unspecified Clinical Failure	1

Product Surveillance Registry Results

Number of Leads Enrolled in Study	471
Number of Leads Active in Study	51
Cumulative Months of Follow-Up	17,553

Qualifying Complications 38

Conductor Fracture	5	Impedance Out of Range	3
Extra Cardiac Stimulation	1	Lead Dislodgement	3
Failure to Capture	21	Oversensing	2
Failure to Sense	2	Other	1



Years	1	2	3	4	5	6	7	at 90 mo
%	95.0%	91.9%	90.2%	90.2%	88.8%	87.2%	86.2%	84.7%
#	236	190	160	142	121	96	73	58

5038 CapSure VDD-2

US Market Release	10Sep1998
CE Approval	15Apr1997
Registered USA Implants	9,649
Estimated Active USA Implants	2,214
Fixation Type	Tines
Pace Sense Polarity	Quadripolar
Steroid Indicator	Yes

US Returned Product Analysis

Conductor Fracture	8
Insulation Breach	3
Crimp/Weld/Bond	0
Other	0

US Acute Lead Observations

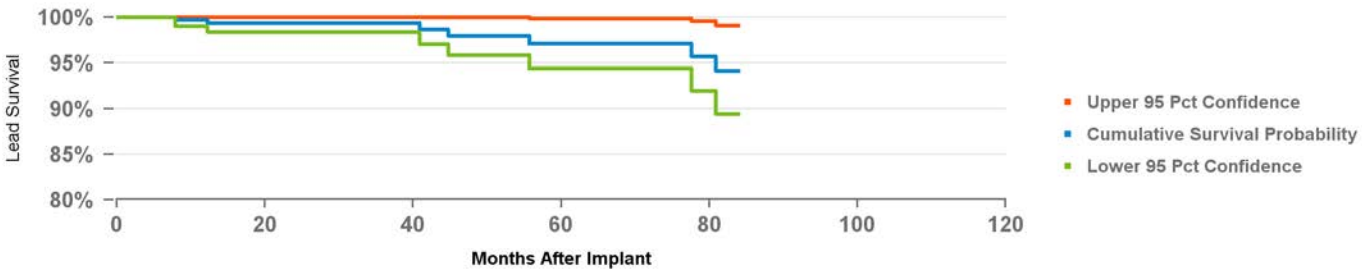
Extra Cardiac Stimulation	1
Failure to Capture	3
Failure to Sense	2
Lead Dislodgement	7
Oversensing	2

Product Surveillance Registry Results

Number of Leads Enrolled in Study	570
Number of Leads Active in Study	3
Cumulative Months of Follow-Up	15,921

Qualifying Complications 8

Conductor Fracture	3	Impedance Out of Range	0
Failure to Capture	2	Other	0
Failure to Sense	3		



Years	1	2	3	4	5	6	at 84 mo
%	99.7%	99.3%	99.3%	97.9%	97.1%	97.1%	94.1%
#	288	218	160	132	105	78	56

ICD and CRT-D Charge Time Performance

Medtronic continues its commitment to providing updated information on charge time performance.

Introduction

Information on charge time performance of Medtronic products is presented in this section of the CRM Product Performance Report. Medtronic implemented the collection of charge time data on July 1, 1999. The data are collected via our ongoing active clinical study of long-term system performance called the Product Surveillance Registry. The study protocol requests device data be routinely taken and sent to Medtronic at no more than 6-month intervals.

In our analysis performed for this report, only charge times resulting from full energy charges are considered. To ensure consistent reporting across devices, the charge time reported at implant represents the last charge time available from date of implant. When more than one charge time is available in a 6-month interval, a conservative approach has been adopted whereby only the maximum charge time in each 6-month interval is reported. As charge time is directly proportional to the time elapsed since the last capacitor reformation, charges occurring within 15 days of a previous charge are excluded. This precludes the reporting of overly optimistic results.

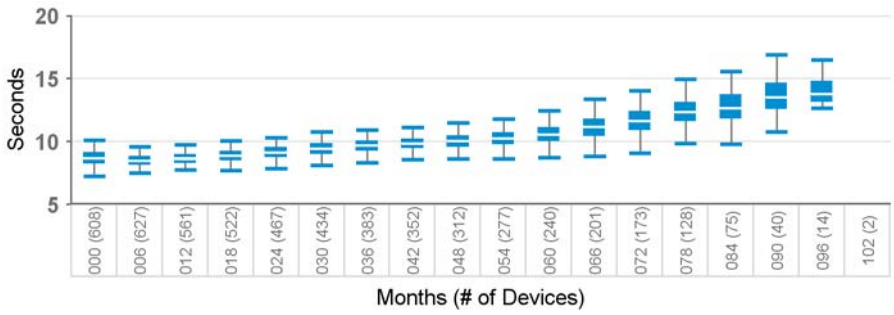
Data from over 20,000 devices contribute to the charge time data in this report. By tracking and reporting this charge time data, Medtronic is able to ascertain the actual performance of its charging circuitry. The insight gained through this information is applied to Medtronic's ongoing efforts to provide charge times that are short and consistent over the life of the product.

Charge time data for ICD and CRT-D models are presented using boxplots at 6-month intervals. The shaded box on the plots represents the middle half of the data – the Interquartile Range (IQR. The white line in the middle of each box is the median charge time. The top of the box representing the IQR is the third quartile or the 75th percentile (i.e., 75% of all charge times fall below this line, whereas the bottom of the box represents the first quartile or the 25th percentile. Vertical lines are drawn from the quartiles to the farthest value not more than 1.5 times the interquartile range. Any values more extreme than the vertical lines are considered outliers.

ICD and CRT-D Charge Time Performance

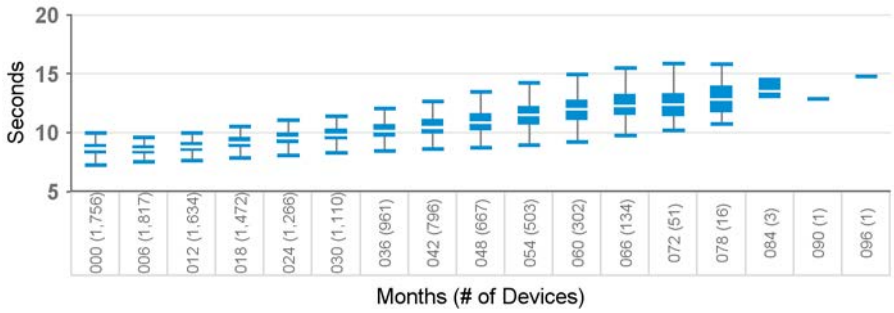
D204DRM, D214DRM, D224DRG, D234DRG

Model Number	Brand
D224DRG	Secura DR



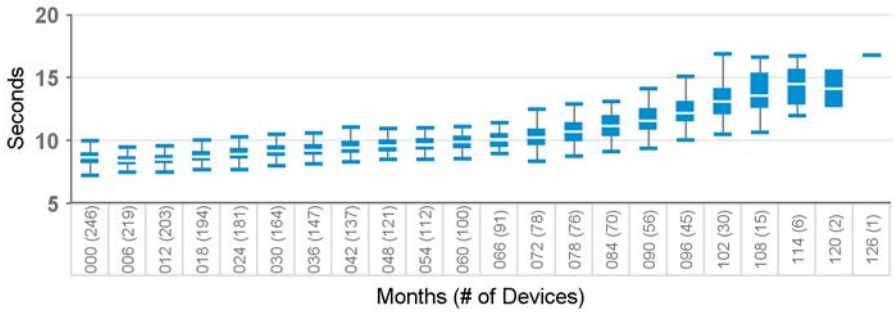
D204TRM, D214TRM, D224TRK, D234TRK

Model Number	Brand
D224TRK	Consulta CRT-D



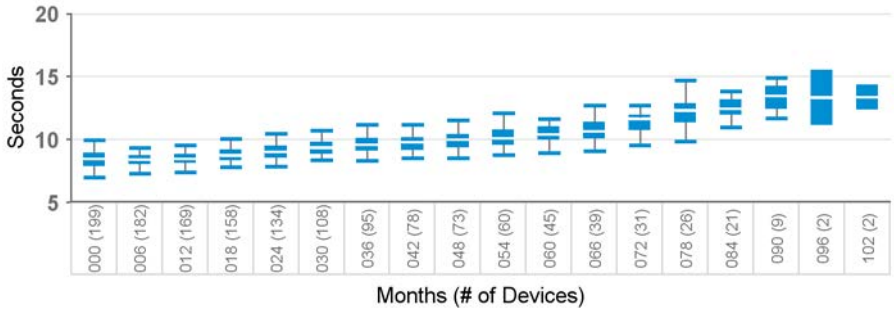
D204VRM, D214VRM, D224VRC, D234VRC

Model Number	Brand
D214VRM	Secura VR
D234VRC	Secura VR



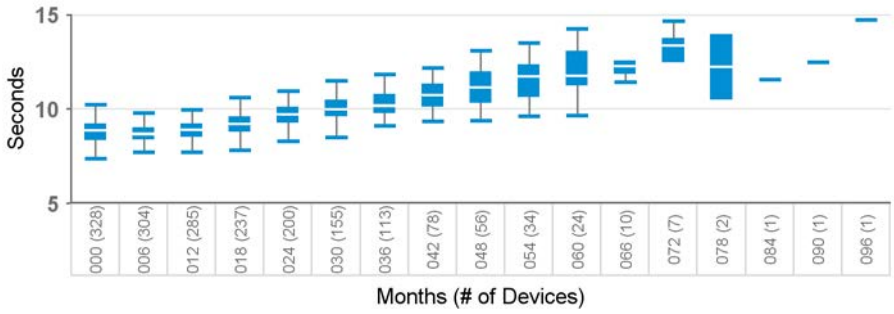
D264DRG, D284DRG, D384DRx, D394DRx

Model Number	Brand
D264DRM	Maximo II DR
D284DRG	Maximo II DR
D384DRG	Cardia DR
D394DRG	Egida DR



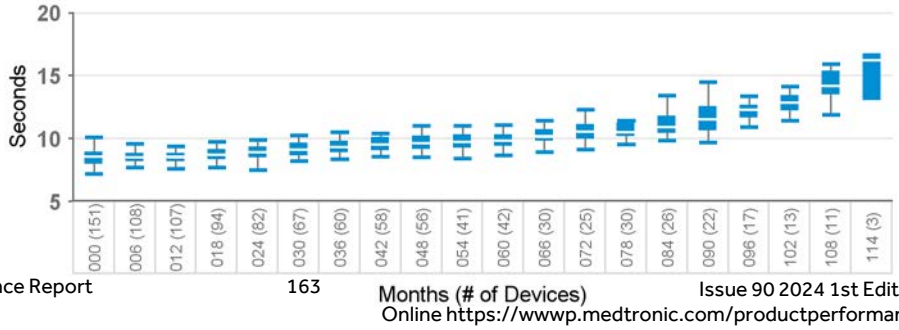
D264TRM, D284TRK, D384TRx, D394TRx

Model Number	Brand
D284TRK	Maximo II CRT-D
D394TRG	Egida CRT-D



D264VRM, D284VRC, D384VRx, D394VRx

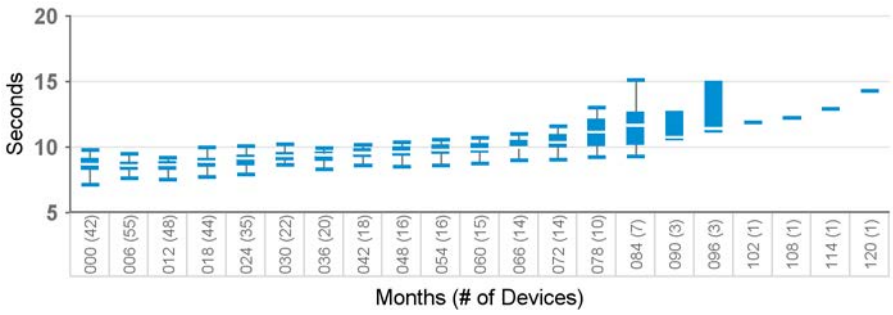
Model Number	Brand
D264VRM	Maximo II VR
D284VRC	Maximo II VR
D384VRG	Cardia VR
D394VRG	Egida VR



ICD and CRT-D Charge Time Performance

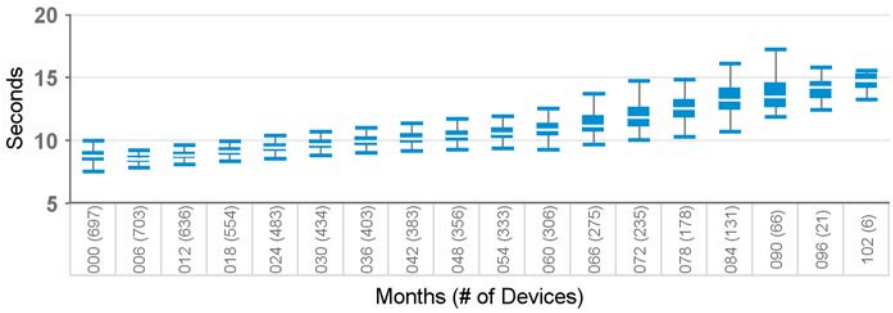
D274VRC, D294VRC

Model Number	Brand
D294VRC	Virtuoso II VR



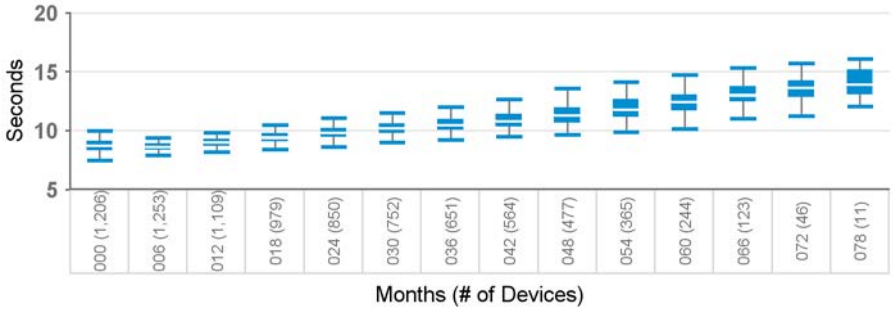
D314DRx

Model Number	Brand
D314DRG	Protecta XT DR
D314DRM	Protecta XT DR



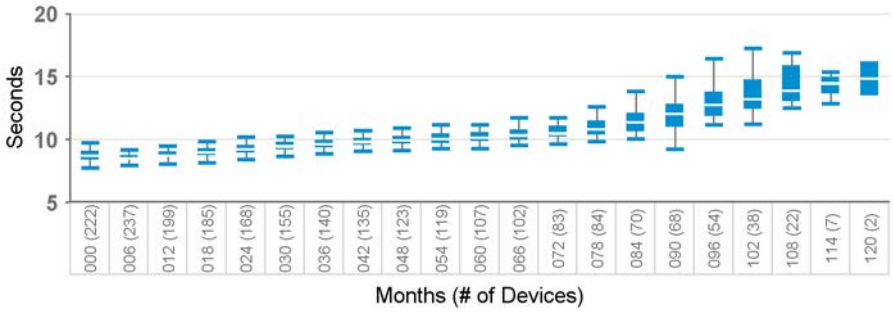
D314TRx

Model Number	Brand
D314TRG	Protecta XT CRT-D



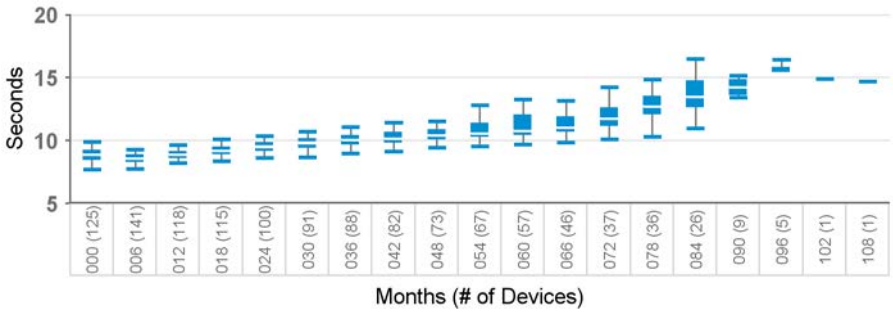
D314VRx

Model Number	Brand
D314VRG	Protecta XT VR
D314VRM	Protecta XT VR



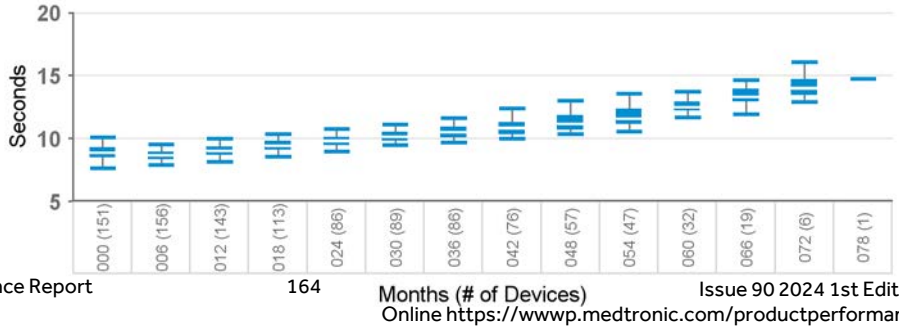
D334DRx, D364DRx

Model Number	Brand
D364DRG	Protecta DR
D364DRM	Protecta DR



D334TRx, D364TRx

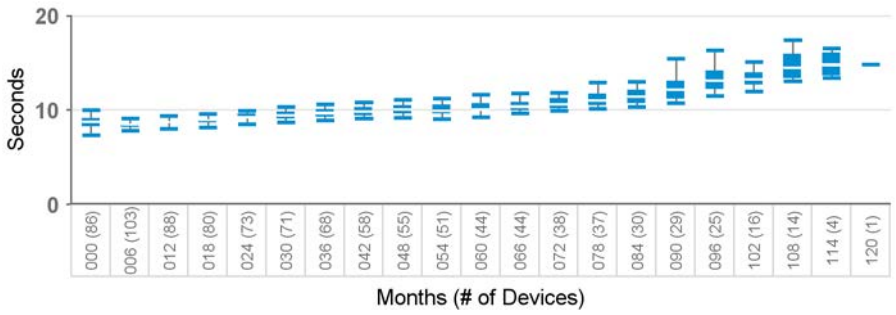
Model Number	Brand
D364TRG	Protecta CRT-D
D364TRM	Protecta CRT-D



ICD and CRT-D Charge Time Performance

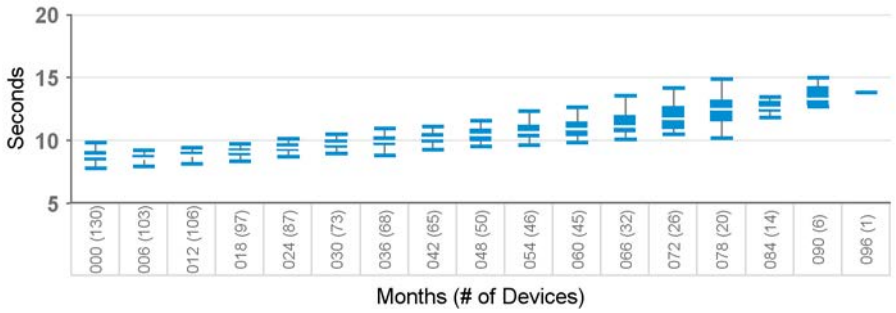
D334VRx, D364VRx

Model Number	Brand
D364VRG	Protecta VR
D364VRM	Protecta VR



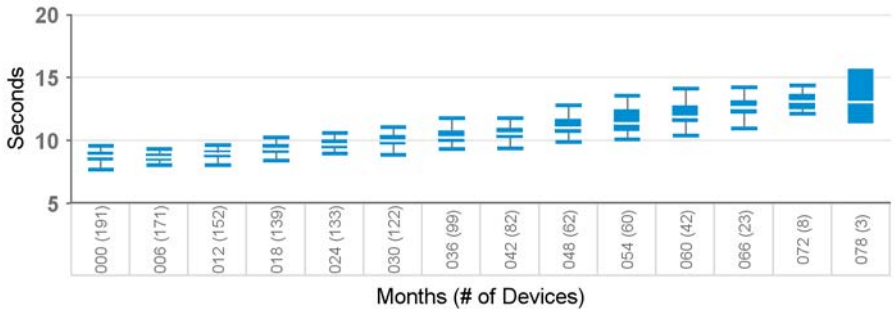
D354DRx

Model Number	Brand
D354DRG	Protecta XT DR
D354DRM	Protecta XT DR



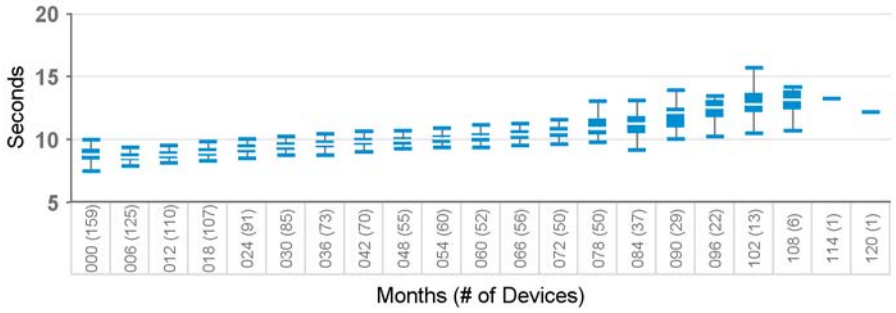
D354TRx

Model Number	Brand
D354TRG	Protecta XT CRT-D
D354TRM	Protecta XT CRT-D



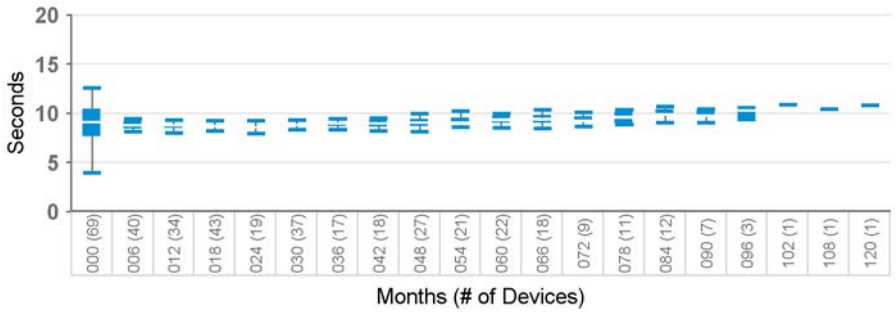
D354VRx

Model Number	Brand
D354VRG	Protecta XT VR
D354VRM	Protecta XT VR



DDxxxxx, DR

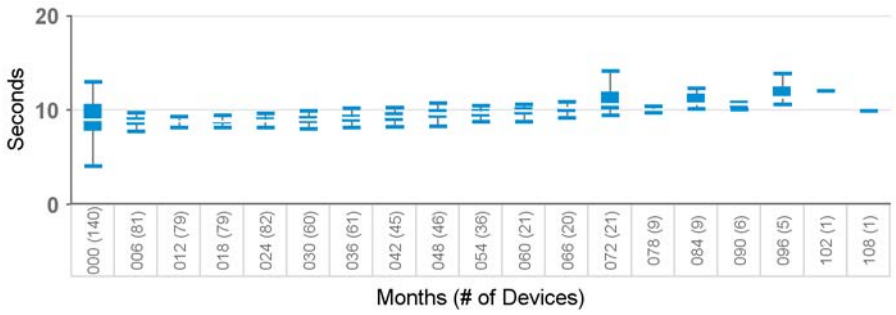
Model Number	Brand
DDBB1D1	Evera XT
DDBB1D4	Evera XT
DDBB2D1	Evera XT
DDBB2D4	Evera XT
DDBC3D1	Evera S
DDBC3D4	Evera S
DDMB1D1	Evera MRI XT
DDMB1D4	Evera MRI XT
DDMB2D1	Evera MRI XT
DDMB2D4	Evera MRI XT
DDMC3D1	Evera MRI S
DDMC3D4	Evera MRI
DDMD3D1	Primo
DDMD3D4	Primo
DDME3D1	Mirro
DDME3D4	Mirro



ICD and CRT-D Charge Time Performance

DTxxxxx, CRT-D

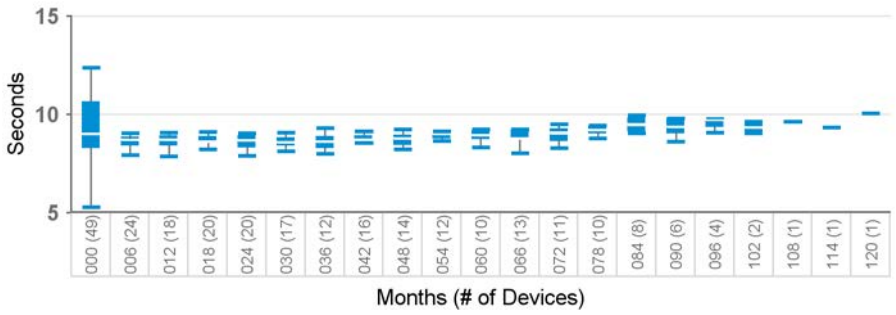
Model Number	Brand
DTBA1D1	Viva XT
DTBA1D4	Viva XT
DTBA1Q1	Viva Quad XT
DTBA1QQ	Viva Quad XT
DTBA2D1	Viva XT
DTBA2D4	Viva XT
DTBA2Q1	Viva Quad XT
DTBA2QQ	Viva Quad XT
DTBB1D1	Viva S
DTBB1D4	Viva S
DTBB1Q1	Viva Quad S
DTBB1QQ	Viva Quad S
DTBB2D1	Viva S
DTBB2D4	Viva S
DTBB2QQ	Viva Quad S
DTBC2D1	Brava
DTBC2D4	Brava
DTBC2Q1	Brava Quad
DTBC2QQ	Brava Quad
DTBX1QQ	Viva Quad C
DTBX2QQ	Viva Quad C
DTMA1D1	Claria MRI
DTMA1D4	Claria MRI
DTMA1Q1	Claria MRI
DTMA1QQ	Claria MRI
DTMA2D1	Claria MRI
DTMA2D4	Claria MRI
DTMA2Q1	Claria MRI
DTMA2QQ	Claria MRI
DTMB1D1	Amplia MRI
DTMB1D4	Amplia MRI
DTMB1Q1	Amplia MRI
DTMB1QQ	Amplia MRI
DTMB2D1	Amplia MRI
DTMB2D4	Amplia MRI
DTMB2Q1	Amplia MRI
DTMB2QQ	Amplia MRI
DTMC1D1	Compia MRI
DTMC1QQ	Compia MRI
DTMC2D1	Compia MRI
DTMC2D4	Compia MRI
DTMC2QQ	Compia MRI



ICD and CRT-D Charge Time Performance

DVxxxxx, VR

Model Number	Brand
DVAB1D1	Visia AF
DVAB1D4	Visia AF
DVAB2D1	Visia AF XT
DVAC3D1	Visia AF S
DVBB1D1	Evera XT
DVBB1D4	Evera XT
DVBB2D1	Evera XT
DVBB2D4	Evera XT
DVBC3D1	Evera S
DVBC3D4	Evera S
DVFB1D1	Visia MRI AF
DVFB1D4	Visia MRI AF
DVFB2D1	Visia MRI AF XT
DVFB2D4	Visia MRI AF XT
DVFC3D1	Visia MRI AF S
DVFC3D4	Visia MRI AF S
DVMB1D4	Evera MRI XT
DVMB2D1	Evera MRI XT
DVMB2D4	Evera MRI XT
DVMC3D1	Evera MRI S
DVMC3D4	Evera MRI S
DVMD3D1	Primo
DVMD3D4	Primo
DVME3D1	Mirro
DVME3D4	Mirro



LINQ II ICM Potential for Amplified Noise

LINQ II Insertable Cardiac Monitoring Systems

Original Date of Communication: November 2023

ORIGINAL COMMUNICATION - NOVEMBER 2023

This notice is to inform risk managers/healthcare professionals that a population of LINQ II ICMs underwent a manufacturing process that may allow for moisture to impact electrode performance. This may create the potential for amplified noise and/or overall signal reduction of the ICM, which may interfere with intended recordings of heart rhythms. This noise pattern is different from occasional noise due to device position/migration, patient activity, or external electromagnetic interference.

As of 25 August 2023, Medtronic has analyzed and confirmed 7 returned devices that have exhibited these characteristics, with zero (0) reports of serious harm due to this issue. The potential for this behavior is limited to a population of 30,074 devices manufactured prior to September 2022. A small number of potentially unused LINQ II devices manufactured before September 2022 were requested to be returned to Medtronic. Based on an analysis of this specific population transmitting on CareLink, Medtronic estimates this issue has the potential to occur in 1.26% of these devices over a period of 4.5 years. If this occurs, potential harms include delayed medical intervention, missed diagnosis, and/or early device replacement.

PATIENT MANAGEMENT RECOMMENDATIONS:

In consultation with our Independent Physician Quality Panel (IPQP), Medtronic emphasizes continued care of patients implanted with an ICM in scope of this communication as per the existing device labeling.

- Encourage enrollment in and regular transmissions to CareLink.
    - Medtronic will apply recurring algorithmic searches on CareLink for the noise pattern and notify the clinician if present. The information used to identify this pattern is not visible to the clinician through CareLink. No further action is required for patients regularly transmitting to CareLink.
- For patients not followed in CareLink:
    - Consider whether enrolling in CareLink is an option, per HRS/EHRA/APHRS/LAHRS guidance.[1] Ongoing CareLink monitoring will reduce the potential for episodes caused by amplified noise to overwrite true episodes before they are reviewed.
    - If noise interferes with the ability to assess the patient's rhythm or reason for monitoring, contact Medtronic Technical Services for assistance (dxhelp@medtronic.com or 1-800-929-4043).
- If the ICM is no longer in use, no further action is necessary.

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[1]Ferrick A, et. al. (2023). 2023 HRS/EHRA/APHRS/LAHRS expert consensus statement on practical management of the remote device clinic. Heart Rhythm, 20(9), e92-e144.

Increased Potential for Reduced Energy or No Energy Delivered During HV Therapy When Programmed AX>B (2023)

Cobalt™ XT, Cobalt and Crome™ ICDs and CRT-Ds

Original Date of Communication: May 2023

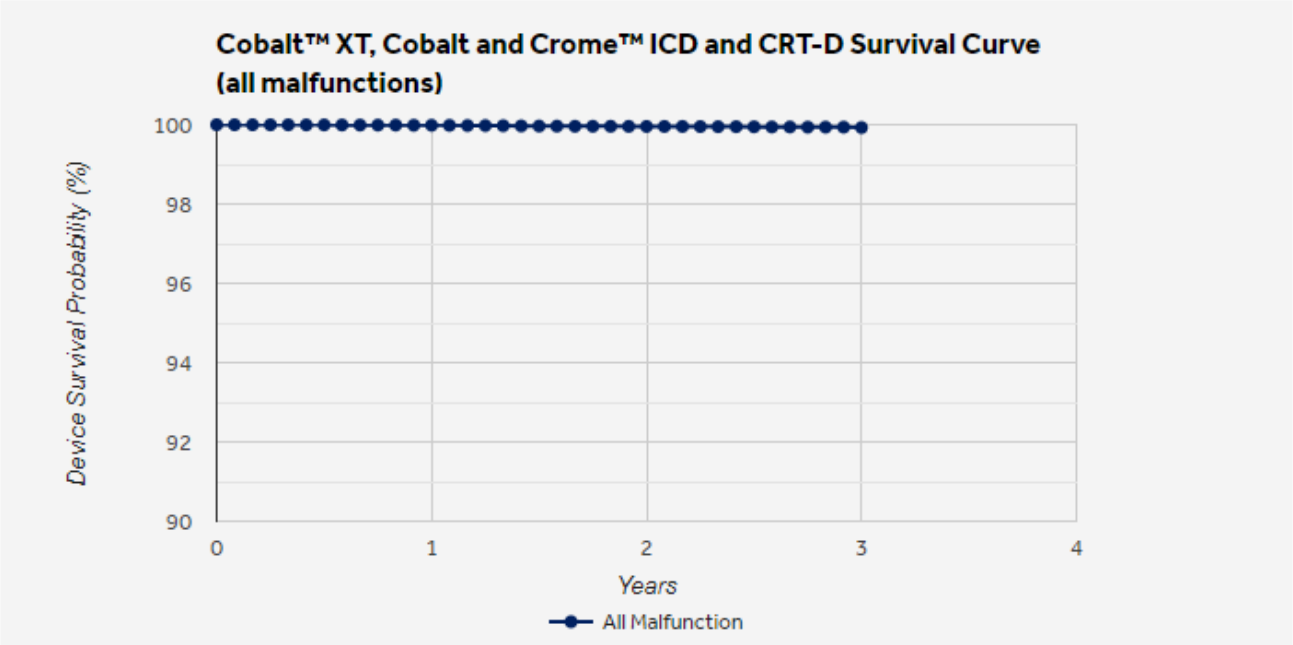
Devices managed with an updated SmartSync tablet (device application software 8.1.0 or higher) are no longer in scope of the May 2023 communication.

STATUS UPDATE - APRIL 2024

As of 13 March 2024, Medtronic has identified 36 devices (representing 0.0036% of devices distributed worldwide) that experienced the issue described in the communication. No permanent harms or deaths have been attributed to this issue. When programmed B>AX, the occurrence rate remains in line with the historic non-advisory population as described in the original communication. To support the patient management recommendations in the May 2023 communication, Medtronic reviewed more than 680,000 shock events that occurred in over 228,000 unique devices.

Medtronic is releasing a software update that aligns SmartSync tablets with the programming recommendations. This update is available in the United States, Europe, Australia and New Zealand and will be made available in other geographies and on other programming platforms pending regulatory approvals. Devices managed with an updated SmartSync tablet (device application software 8.1.0 or higher) are no longer in scope of the May 2023 communication.

The overall reliability of these devices remains high. The graph below shows device survival probability inclusive of all confirmed malfunctions.



	1 yr	2 yr	3 yr
%	100.0%	100.0%	99.9%
#	76,347	44,532	12,119

ORIGINAL COMMUNICATION - MAY 2023

This communication advises physicians of a rare potential for reduced- or no-energy output during high voltage (HV) therapy (typically 0-12J) in implantable cardioverter defibrillators (ICDs) and cardiac resynchronization therapy defibrillators (CRT-Ds) manufactured with a specific (glassed) feedthrough, including currently available ICDs and CRT-Ds. Through 10 April 2023, Medtronic has identified 27 devices from approximately 816,000 devices (representing 0.003%) distributed worldwide that have experienced a reduced- or no-energy HV therapy due to the issue described in this letter. There have been no deaths due to this issue in the glassed feedthrough device population.

With current field programming, devices with a glassed feedthrough may experience increased potential (projected to be 0.02% at 5 years) for reduced- or no-energy output during HV therapy. In some cases, a persistent 50% drop in all pacing lead impedances may be displayed; lead function, however, is not affected. See Issue Details below for further information on root cause, projected rates, risks, and potential harms.

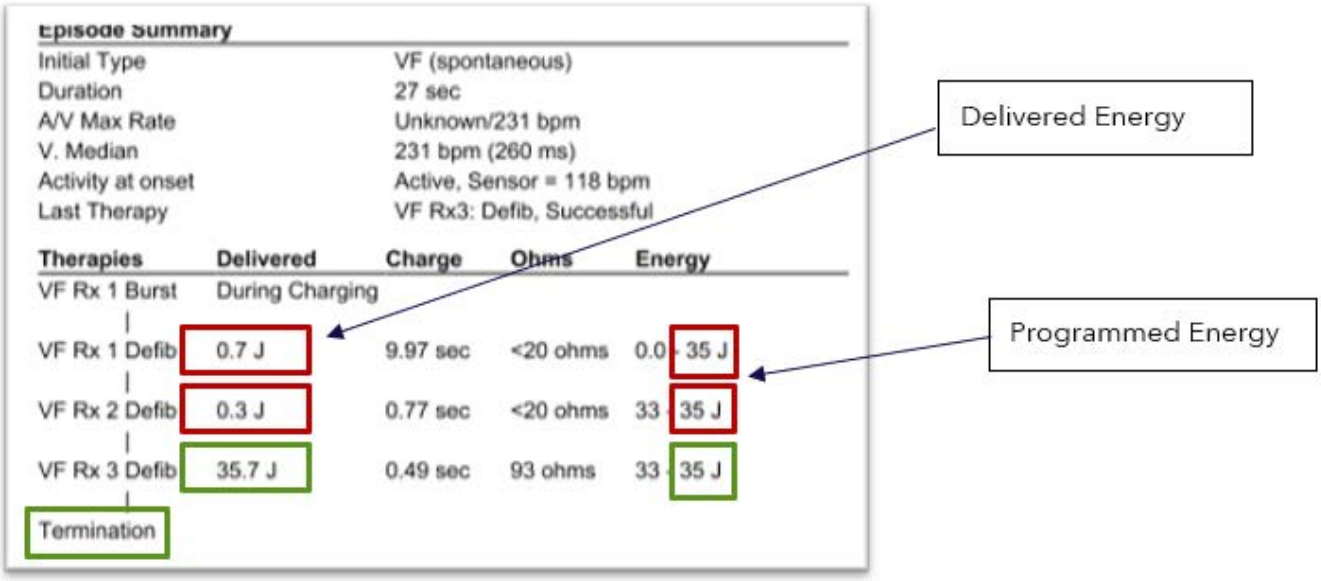
A broader analysis was conducted to determine the incidence of device related reduced- or no-energy HV therapy events outside of the above population, with implants dating back to 2012. Using these historical observed events, projected rates for this population of devices is 0.002% at five (5) years and 0.006% at nine (9) years. This analysis identified two deaths from the historical population in which there was evidence suggesting a device-related reduced- or no-energy HV therapy occurred.

Should this issue occur, pacing, sensing, episode detection, anti-tachycardia pacing (ATP) therapies, battery longevity, and telemetry remain functional. **When devices in the glassed feedthrough population are programmed exclusively in the B>AX configuration, the potential for a reduced- or no-energy HV therapy is 0.002% at five (5) years and 0.005% at nine (9) years, comparable to historical device performance.**

PATIENT MANAGEMENT RECOMMENDATIONS:

Medtronic recognizes that each patient requires unique clinical considerations. Based on internal investigation and external consultation with our Independent Physician Quality Panel (IPQP), Medtronic provides the following guidance:

- **Prophylactic device replacement is NOT recommended.**
    - The risk of mortality for patients after reprogramming is 0.001% at 9 years and is less than the risk of patient mortality due to complications associated with device replacement (0.032% - 0.043%[1,2,3]).
- **Program all HV therapy pathways B>AX in all therapy zones to minimize the risk for this issue.**
    - Note: Using "Get Medtronic Nominals" **will require manual reprogramming of Rx5 and Rx6 to B>AX** for all ventricular therapies.
    - For patients remotely followed via CareLink, your Medtronic representative will provide a report to assist with identifying patients who may have one or more HV therapy pathways programmed AX>B. You may contact your local representative to obtain an updated copy of the report at any time.
- **Prioritize reprogramming patients who have both a history of HV therapy and Rx1 programmed AX>B.**
    - Rx1 provides the greatest statistical likelihood to resolve an arrhythmia, and therefore it is important to minimize risk of a reduced- or no-energy HV therapy in the first sequence.
- **For remaining patients with AX>B programming in any HV therapy sequence, schedule the next follow-up for in-clinic reprogramming, with the appropriate discretion**, to minimize potential for reduced- or no-energy HV therapies to occur.
- Per standard practice, check tachyarrhythmia episodes to determine effectiveness of therapies that have been delivered.
    - Instruct patients to contact the clinic if they receive HV therapy or hear an audible tone coming from their device.
    - Verify delivered energy is consistent with programmed energy in the Episode Summary. Note: The image below highlights an episode experiencing intermittent reduced HV therapies (red boxes).



Example screen illustrating reduced-energy shocks for an Evera XT DR device.

- After an SCP event, pacing, sensing, episode detection, and anti-tachycardia pacing (ATP) therapies are not impacted; additionally, HV charging, battery longevity and Bluetooth telemetry are not impacted.
- **Contact Medtronic Technical Services (1-800-929-4043) or your local representative if one of the following is observed as these may be an indication of either a device or lead-related issue:**
    - Reduced- or no-energy HV therapy is displayed in Episode Text (regardless of programmed pathway)
    - A persistent drop of approximately 50% in RA, RV and LV pacing lead impedance measurements as this may be an indication of increased potential for a future reduced- or no-energy therapy.

ISSUE DETAILS:

There is an increased potential for a reduced- or no-energy HV therapy in the AX>B configuration when all the following conditions are met:

- The device has a glassed feedthrough (manufactured after July 2017).
- There is significant separation of the layers of insulation materials in the feedthrough components of the device header.
- An unintended current pathway forms within the void created by the insulation separation, capable of conducting high levels of current during HV therapy.

When an unintended current pathway is detected during HV therapy, the Short Circuit Protection (SCP) feature may trigger (see Appendix A). This behavior can be intermittent; both full-energy and reduced-energy HV therapies within the same episode have been observed. SCP events may also be lead related; for both lead-related and device-related unintended current pathways, the defibrillation waveform is truncated early in the energy delivery sequence, resulting in reduced or no energy being delivered (~0-12J).

RATES OF OCCURRENCE FOR DEVICE-RELATED REDUCED- or NO-ENERGY HV THERAPY:

Through 10 April 2023, 27 devices with glassed feedthroughs have been identified as experiencing a reduced or no-energy HV therapy (0.003% out of 816,000 distributed devices). Of these, 26 were in devices with an AX>B delivered pathway. Based on an analysis of patients with a glassed feedthrough device and with a history of HV therapy, the observed rate for this issue is 0.03%. See Table 1 below for projected rates of occurrence and risk for harm.

Potential harms related to reduced- or no-energy HV therapy include failure to terminate an arrhythmia, which could lead to death, as well as complications associated with device replacement and/or unnecessary lead replacement if the reduced- or no-energy HV therapy is erroneously attributed to a lead failure.

TABLE 1: Comparison of projected event rates and risk of catastrophic harm, with and without reprogramming

Population		Projected event rate (one or more reduced- or no-energy HV therapies in an episode)	Mortality risk of this issue, considering the probability a sequence of six HV therapies fails to terminate an arrhythmia
Glassed feedthrough devices with current field programming (~816,000 devices)	Overall Population of Devices	**0.02% @ 5 years***	**0.004% @ 5 years***
	For Patients with History of HV Therapy	**0.48% @ 5 years***	**0.08% @ 5 years***
Glassed feedthrough devices after all HV pathways reprogrammed B>AX	Overall Population of Devices	**0.005% @ 9 years****	**0.001% @ 9 years****
	For Patients with History of HV Therapy	**0.04% @ 9 years****	**0.01% @ 9 years****
Historical devices dating back to 2012 (~651,000 devices)	Overall Population of Devices	**0.006% @ 9years****	**0.001% @ 9years****
	For Patients with History of HV Therapy	**0.05% @ 9 years****	**0.01% @ 9 years****

* A timeframe of 5 years is used for this projection given the average implant duration of the devices in scope of this communication is approximately 4 years and allowing for adequate time for reprogramming.

** A time frame of 9 years is used based on the weighted average for device longevity for ICDs and CRTDs.

Medtronic is updating Instructions for Use, HV therapy nominals and the programmer interfaces for these device models to be consistent with information in this letter. Medtronic will release additional information once the necessary regulatory approvals have been received, as applicable in the local region.

APPENDIX A – ADDITIONAL DETAILS ON SHORT CIRCUIT PROTECTION (SCP)

Short Circuit Protection (SCP) is a safety feature that can only occur during high voltage (HV) therapy. SCP is designed to truncate energy delivery to protect the device when an unintended current pathway is detected during a shock. An SCP event can occur when an unintended current pathway develops either in the lead or in the device. **Contact Medtronic for additional guidance if you believe an SCP event occurred.**

Programming all high voltage delivery pathways to B>AX will minimize the effect of an unintended current pathway in the device header (e.g., feedthrough), thereby minimizing the potential for an SCP event. Comparing the programmed energy to the delivered energy in the Episode Text for a treated episode can be used to identify SCP events. The lead impedance in the Episode Text will also display <20 ohms. Refer to the sections below on how to identify if an SCP event has occurred.

For Cobalt/Crome ICD and CRT-D devices:

Identifying SCP events during high voltage (HV) therapy delivery: When an SCP event has occurred, the device will issue an RV Defibrillation Lead Impedance CareAlert. Audible and wireless alerts are issued, if enabled. These devices are shipped with alerts enabled and are nominally active once implant detection completes.

A CareAlert will occur simultaneous with HV therapy delivery and will specifically report "RV Defib Lead Impedance 0 Ω" with the same time stamp as the therapy delivery. The alert condition is displayed in the CareAlert Events log (Data >> CareAlert Events). The Quick Look Observations will also display "Alert: RV defib lead impedance warning on Mmm/DD/YYYY." SCP events are not reflected in the long-term lead impedance trends.

Following an SCP event in devices with both the SVC Coil and Active Can enabled, the device will turn off the SVC coil. If the SCP event is caused by a lead integrity issue involving the SVC coil, turning off the SVC coil can allow any subsequent shocks to be delivered using the RV Coil -to- Active Can vector. The programmed therapy parameters will indicate the SVC Coil has been automatically disabled. The SVC coil will remain off until it is turned back on by the clinician.

If an SCP event occurs during a manual shock delivery, there will be no episode data. For manual shock deliveries, review the shock impedance and the delivered energy from the Last High Voltage Therapy section on the Battery and Lead Measurement screen of the programmer.

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[1]Tarakji KG, et al. Antibacterial Envelope to Prevent Cardiac Implantable Device Infection. The New England Journal of Medicine. 2019; 380(20):1895-1905.
[2]Medtronic Data on File. MDT2260884-CRHF CIED Infection Report; Agile: MDT2260884, Version 2.0, 11/02/2015.
[3]Birnie D, et al. Complications associated with defibrillation threshold testing: The Canadian experience. Heart Rhythm. 2008; 5(3):387-90.

Increased Potential for Reduced Energy or No Energy Delivered During HV Therapy When Programmed AX>B (2023)

Claria, Amplia, Compia, Viva, Brava, Visia AF, Evera, Primo, Mirro ICDs & CRT-Ds

Original Date of Communication: May 2023

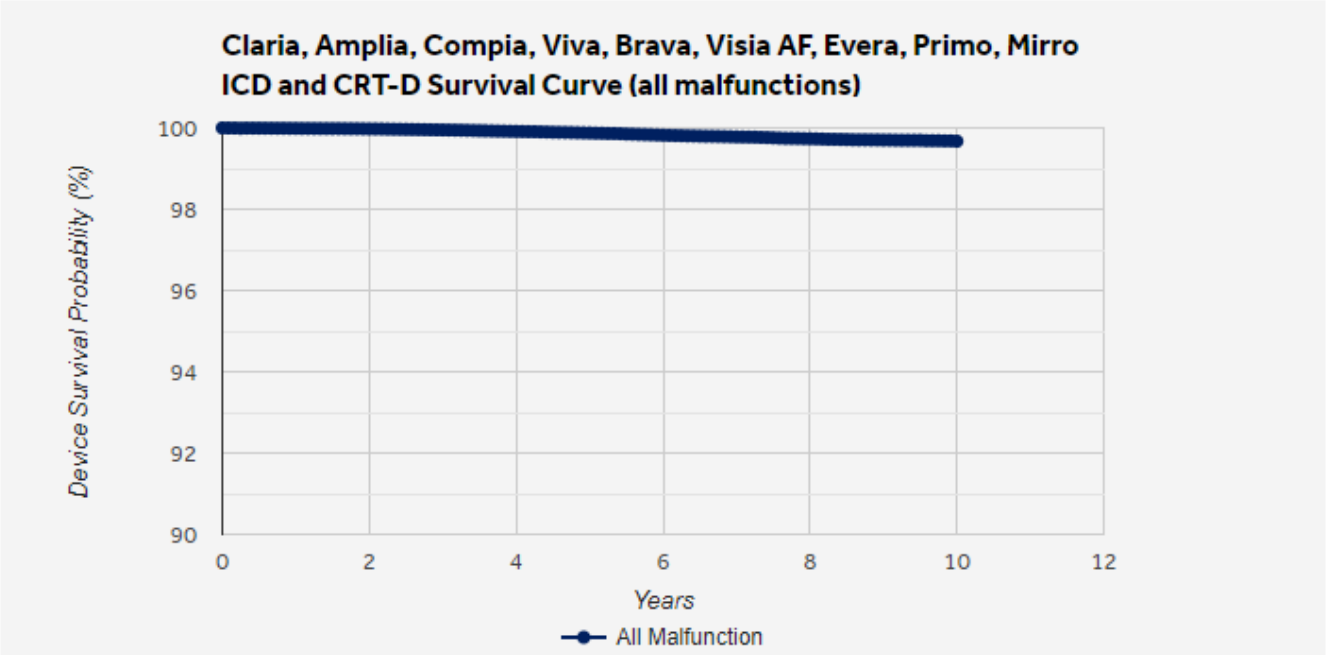
Devices managed with an updated SmartSync tablet (device application software 2.1.0 or higher) are no longer in scope of the May 2023 communication.

STATUS UPDATE – APRIL 2024

As of 13 March 2024, Medtronic has identified 36 devices (representing 0.0036% of devices distributed worldwide) that experienced the issue described in the communication. No permanent harms or deaths have been attributed to this issue. When programmed B>AX, the occurrence rate remains in line with the historic non-advisory population as described in the original communication. To support the recommendations in the May 2023 communication, Medtronic reviewed more than 680,000 shock events that occurred in over 228,000 unique devices.

Medtronic is releasing a software update that aligns SmartSync tablets with the programming recommendations. This update is available in the United States, Europe, Australia and New Zealand and will be made available in other geographies, and on other programming platforms, pending regulatory approvals. Devices managed with an updated SmartSync tablet (device application software 2.1.0 or higher) are no longer in scope of the May 2023 communication.

The overall reliability of these devices remains high. The graph below shows device survival probability inclusive of all confirmed malfunctions.



	1 yr	2 yr	3 yr	4 yr	5 yr	6 yr	7 yr	8 yr	9 yr	10 yr
%	100.0%	100.0%	100.0%	99.9%	99.9%	99.8%	99.8%	99.7%	99.7%	99.7%
#	619,959	546,940	481,354	406,107	321,272	238,770	158,862	91,819	45,727	13,844

ORIGINAL COMMUNICATION - MAY 2023

This communication advises physicians of a rare potential for reduced- or no-energy output during high voltage (HV) therapy (typically 0-12J) in implantable cardioverter defibrillators (ICDs) and cardiac resynchronization therapy defibrillators (CRT-Ds) manufactured with a specific (glassed) feedthrough, including currently available ICDs and CRT-Ds. Through 10 April 2023, Medtronic has identified 27 devices from approximately 816,000 devices (representing 0.003%) distributed worldwide that have experienced a reduced- or no-energy HV therapy due to the issue described in this letter. There have been no deaths due to this issue in the glassed feedthrough device population.

With current field programming, devices with a glassed feedthrough may experience increased potential (projected to be 0.02% at 5 years) for reduced- or no-energy output during HV therapy. In some cases, a persistent 50% drop in all pacing lead impedances may be displayed; lead function, however, is not affected. See Issue Details below for further information on root cause, projected rates, risks, and potential harms.

A broader analysis was conducted to determine the incidence of device related reduced- or no-energy HV therapy events outside of the above population, with implants dating back to 2012. Using these historical observed events, projected rates for this population of devices is 0.002% at five (5) years and 0.006% at nine (9) years. This analysis identified two deaths from the historical population in which there was evidence suggesting a device-related reduced- or no-energy HV therapy occurred.

Should this issue occur, pacing, sensing, episode detection, anti-tachycardia pacing (ATP) therapies, battery longevity, and telemetry remain functional. **When devices in the glassed feedthrough population are programmed exclusively in the B>AX configuration, the potential for a reduced- or no-energy HV therapy is 0.002% at five (5) years and 0.005% at nine (9) years, comparable to historical device performance.**

PATIENT MANAGEMENT RECOMMENDATIONS:

Medtronic recognizes that each patient requires unique clinical considerations. Based on internal investigation and external consultation with our Independent Physician Quality Panel (IPQP), Medtronic provides the following guidance:

- **Prophylactic device replacement is NOT recommended.**
    - The risk of mortality for patients after reprogramming is 0.001% at 9 years and is less than the risk of patient mortality due to complications associated with device replacement (0.032% - 0.043%[1,2,3]).
- **Program all HV therapy pathways B>AX in all therapy zones to minimize the risk for this issue.**
    - Note: Using "Get Medtronic Nominals" **will require manual reprogramming of Rx5 and Rx6 to B>AX** for all ventricular therapies.
    - For patients remotely followed via CareLink, your Medtronic representative will provide a report to assist with identifying patients who may have one or more HV therapy pathways programmed AX>B. You may contact your local representative to obtain an updated copy of the report at any time.
- **Prioritize reprogramming patients who have both a history of HV therapy and Rx1 programmed AX>B.**
    - Rx1 provides the greatest statistical likelihood to resolve an arrhythmia, and therefore it is important to minimize risk of a reduced- or no-energy HV therapy in the first sequence.
- **For remaining patients with AX>B programming in any HV therapy sequence, schedule the next follow-up for in-clinic reprogramming, with the appropriate discretion**, to minimize potential for reduced- or no-energy HV therapies to occur.
- Per standard practice, check tachyarrhythmia episodes to determine effectiveness of therapies that have been delivered.
    - Instruct patients to contact the clinic if they receive HV therapy or hear an audible tone coming from their device.
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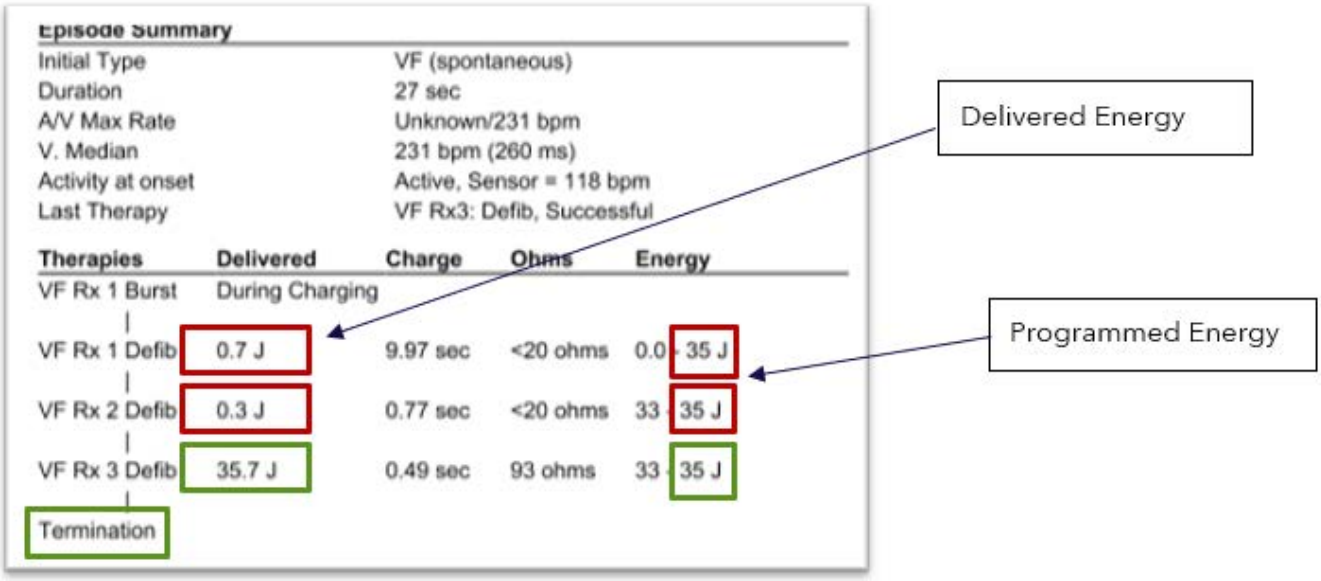

Example screen illustrating reduced-energy shocks for an Evera XT DR device.

- After an SCP event, pacing, sensing, episode detection, and anti-tachycardia pacing (ATP) therapies are not impacted; additionally, HV charging, battery longevity and Bluetooth telemetry are not impacted.
- **Contact Medtronic Technical Services (1-800-929-4043) or your local representative if one of the following is observed as these may be an indication of either a device or lead-related issue:**
    - Reduced- or no-energy HV therapy is displayed in Episode Text (regardless of programmed pathway)
    - A persistent drop of approximately 50% in RA, RV and LV pacing lead impedance measurements as this may be an indication of increased potential for a future reduced- or no-energy therapy.

ISSUE DETAILS:

There is an increased potential for a reduced- or no-energy HV therapy in the AX>B configuration when all the following conditions are met:

- The device has a glassed feedthrough (manufactured after July 2017).
- There is significant separation of the layers of insulation materials in the feedthrough components of the device header.
- An unintended current pathway forms within the void created by the insulation separation, capable of conducting high levels of current during HV therapy.

When an unintended current pathway is detected during HV therapy, the Short Circuit Protection (SCP) feature may trigger (see Appendix A). This behavior can be intermittent; both full-energy and reduced-energy HV therapies within the same episode have been observed. SCP events may also be lead related; for both lead-related and device-related unintended current pathways, the defibrillation waveform is truncated early in the energy delivery sequence, resulting in reduced or no energy being delivered (~0-12J).

RATES OF OCCURRENCE FOR DEVICE-RELATED REDUCED- or NO-ENERGY HV THERAPY:

Through 10 April 2023, 27 devices with glassed feedthroughs have been identified as experiencing a reduced or no-energy HV therapy (0.003% out of 816,000 distributed devices). Of these, 26 were in devices with an AX>B delivered pathway. Based on an analysis of patients with a glassed feedthrough device and with a history of HV therapy, the observed rate for this issue is 0.03%. See Table 1 below for projected rates of occurrence and risk for harm. Potential harms related to reduced- or no-energy HV therapy include failure to terminate an arrhythmia, which could lead to death, as well as complications associated with device replacement and/or unnecessary lead replacement if the reduced- or no-energy HV therapy is erroneously attributed to a lead failure.

TABLE 1: Comparison of projected event rates and risk of catastrophic harm, with and without reprogramming

Population		Projected event rate (one or more reduced- or no-energy HV therapies in an episode)	Mortality risk of this issue, considering the probability a sequence of six HV therapies fails to terminate an arrhythmia
Glassed feedthrough devices with current field programming (~816,000 devices)	Overall Population of Devices	**0.02% @ 5 years***	**0.004% @ 5 years***
	For Patients with History of HV Therapy	**0.48% @ 5 years***	**0.08% @ 5 years***
Glassed feedthrough devices after all HV pathways reprogrammed B>AX	Overall Population of Devices	**0.005% @ 9 years****	**0.001% @ 9 years****
	For Patients with History of HV Therapy	**0.04% @ 9 years****	**0.01% @ 9 years****
Historical devices dating back to 2012 (~651,000 devices)	Overall Population of Devices	**0.006% @ 9years****	**0.001% @ 9years****
	For Patients with History of HV Therapy	**0.05% @ 9 years****	**0.01% @ 9 years****

* A timeframe of 5 years is used for this projection given the average implant duration of the devices in scope of this communication is approximately 4 years and allowing for adequate time for reprogramming.

** A time frame of 9 years is used based on the weighted average for device longevity for ICDs and CRTDs.

Medtronic is updating Instructions for Use, HV therapy nominals and the programmer interfaces for these device models to be consistent with information in this letter. Medtronic will release additional information once the necessary regulatory approvals have been received, as applicable in the local region.

APPENDIX A – ADDITIONAL DETAILS ON SHORT CIRCUIT PROTECTION (SCP)

Short Circuit Protection (SCP) is a safety feature that can only occur during high voltage (HV) therapy. SCP is designed to truncate energy delivery to protect the device when an unintended current pathway is detected during a shock. An SCP event can occur when an unintended current pathway develops either in the lead or in the device. **Contact Medtronic for additional guidance if you believe an SCP event occurred.**

Programming all high voltage delivery pathways to B>AX will minimize the effect of an unintended current pathway in the device header (e.g., feedthrough), thereby minimizing the potential for an SCP event. Comparing the programmed energy to the delivered energy in the Episode Text for a treated episode can be used to identify SCP events. The lead impedance in the Episode Text will also display <20 ohms. Refer to the sections below on how to identify if an SCP event has occurred.

For Evera/Visia AF/Primo/Mirro ICDs and Viva/Brava/Claria/Amplia/Compia CRT-D devices:

> Identifying SCP events: For episodes in which a high voltage therapy was delivered, if there is a significantly reduced-energy or no-energy shock delivered, the device may have experienced an SCP event. In each stored episode, delivered energy is displayed in the Episode Text and on the Interval Plot. If an SCP event occurred, this text may indicate that a lower energy was delivered and <20 ohm impedance value. Note: there is currently no available SCP alert in this family of devices.
>
> Clinicians can consider enabling the device audible alert and/or CareAlert for "Number of Shocks Delivered in an Episode," with "N = 1." Turning this alert "ON" may help ensure the patient and/or clinic is made aware when a HV therapy is delivered by the device.

If an SCP event occurs during a manual shock delivery, there will be no episode data. For manual shock deliveries, review the shock impedance and the delivered energy from the Last High Voltage Therapy section on the Battery and Lead Measurement screen of the programmer.

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[1]Tarakji KG, et al. Antibacterial Envelope to Prevent Cardiac Implantable Device Infection. The New England Journal of Medicine. 2019; 380(20):1895-1905.
[2]Medtronic Data on File. MDT2260884-CRHF CIED Infection Report; Agile: MDT2260884, Version 2.0, 11/02/2015.
[3]Birnie D, et al. Complications associated with defibrillation threshold testing: The Canadian experience. Heart Rhythm. 2008; 5(3):387-90.

Product Education Brief: Alert Threshold for Lead Impedances

Azure™ and Astra™ pacemakers, and Percepta™, Serena™ and Solara™ CRT-P

Original Date of Communication: April 2023

Overview

This Product Education Brief describes a lead impedance alert behavior in Medtronic Azure™, Astra™, Percepta™, Serena™, and Solara™ devices that may be observed when the pacing lead impedance displayed is slightly above the programmed lower alert threshold.

Details regarding CareAlerts and impedance measurements

In Azure, Astra, Percepta, Serena, and Solara devices, a CareAlert may be triggered when the lead impedance displayed is slightly above the programmed lower alert threshold.
See Figure 1 and 2 for an example case where the lower threshold for a lead impedance alert is programmed at 200 ohms. In the Lead Impedance Trend (Figure 1) the precise measured impedance value is 209 ohms; and yet in the CareAlert display (Figure 2) an alert was triggered indicating the impedance crossed the 200 ohm impedance threshold, and suggesting the impedance is 190 ohms. This scenario can happen due to the range of impedance values used for alert monitoring. In this scenario, the devices are functioning within design specifications and tolerances.

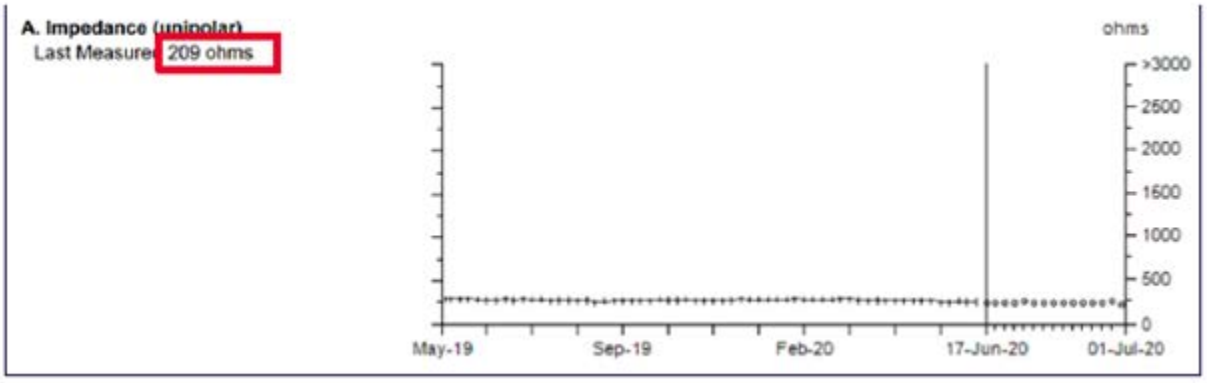

Figure 1– Lead Impedance Trend showing precise impedance values over time

Date/Time	Event	Threshold
01-Jul-2020 03:00:00	*A. Unipolar lead impedanc	190 ohms. 200 ohms

Figure 2– CareAlert triggered showing 190 ohms impedance value with a 200ohm alert threshold

While most leads are programmed to pace bipolar, every night the device will assess all lead impedance vectors. Unipolar measurements tend to be lower than bipolar measurements in the same system. Therefore, the nightly unipolar lead impedance measurement will likely be closer to the programmed lower alert threshold than the bipolar measurement.

The impedance value range for alerts is never higher than the measured impedance, so all impedance values that are below the programmed threshold will generate an alert as programmed.

Patient Management

Clinicians should continue to follow patients per their standard clinical practice when a CareAlert triggers for lead impedances. Impedance alerts are designed to prompt the clinician to review impedances in the Lead Impedance Trend Log. The Lead Impedance Trend records precise lead impedance measurements over time. These historic impedance measurements provide evidence as to whether the impedance is stable and functioning as designed (albeit near the programmed threshold); or unstable and necessitating further assessment and/or close monitoring. Note: If impedance values reported in the Lead Impedance Trend indicate impedances are below the programmed lower threshold, then the lead should be assessed for possible insulation breach per standard clinical practice.

Potential for Intermittent-Reduced-Energy Shock Due To Short Circuit Protection Event (2022)

Cobalt™ XT, Cobalt™ and Crome™ ICDs and CRT-Ds

Original Date of Communication: June 2022

STATUS UPDATE - APRIL 2024

Manufacturing updates may increase device programming options. Contact Medtronic Technical Services for details.

As of 10 August 2022, a software release is now available for CareLink™ SmartSync™ Device Managers (SmartSync). Once a SmartSync tablet has been updated with software application D00U005 version 7.1.1 (or higher), the programmer will deploy a device update to Cobalt and Crome implantable cardioverter defibrillators (ICDs) and cardiac resynchronization therapy defibrillators (CRT-Ds) to prevent the potential for an intermittent, second-phase Short Circuit Protection (SCP) event during high-voltage (HV) therapy delivery. This software update was previously announced as part of an advisory communication Medtronic issued in June 2022 (see original communication posted below).

Through 20 March 2024, Medtronic has confirmed 136 devices (representing 0.08% of devices distributed worldwide) have experienced a second-phase SCP event. In all events, ~79% of the programmed shock energy was delivered. No events have occurred in devices programmed B>AX that have the August 2022 software update. No permanent harms or deaths have been directly attributed to this issue.

Medtronic representatives are available to work with clinicians to ensure all SmartSync tablets in their facility(s) are updated with application software D00U005 version 7.1.1 (or higher). The software can be installed by connecting each SmartSync tablet to the internet, opening the SmartSync App and accepting the on-screen prompts.

As disclosed in the June 2022 patient management recommendations, patients will require an in-clinic visit for the update to be installed into their device via interrogation with an updated SmartSync tablet. Once installed, the update will allow devices to deliver the full programmed shock energy. Programming B>AX pathway and Active Can enabled is still required. On-screen messaging will reinforce these programming recommendations.

Clinicians can identify if a patient's device has successfully received the update by viewing the displayed Configuration ID and confirming the first number in the sequence is as indicated below:

- 11-1-0 or higher for Cobalt/Crome VR devices
- 10-1-0 or higher for Cobalt/Crome DR and CRT-D devices

The Device Configuration ID can be found under the "Device Information" section of the SmartSync Parameters Report, or for CareLink patients, under the Transmission Details page by selecting <More Reports > 'Parameters.'

ORIGINAL COMMUNICATION - JUNE 2022

This communication provides notice of the potential for reduced shock energy (~79% of programmed energy) during high-voltage (HV) therapy for Cobalt and Crome implantable cardioverter defibrillators (ICDs) and cardiac resynchronization therapy defibrillators (CRT-Ds). Through 03 June 2022, Medtronic has identified 27 devices (0.03% of devices distributed worldwide) that have experienced a reduced-energy shock, which is accompanied by a Short Circuit Protection (SCP) alert. Medtronic has not received any reports of permanent harm or death due to this issue. Medtronic has submitted a device software update to address this issue and anticipates it will be available for download into implanted devices <beginning third/fourth quarter of calendar year 2022>, pending regulatory approvals.

ISSUE SUMMARY:

Short Circuit Protection (SCP) alerts trigger during HV therapy during the first- or second-phase of the HV biphasic waveform delivery. This communication focuses on second-phase SCP events that are the result of a secondary, low-level current pathway detected in the HV circuitry.

- A second-phase SCP event **will deliver approximately 79%** of programmed energy as a monophasic waveform.
- **Defibrillation efficacy is reduced by ~1%**for this type of SCP event when HV therapy is programmed to 40J, considering cumulative success across the full series of shocks (Rx1 through Rx6).

Based on analysis of peer-reviewed literature as well as CareLink data on shock efficacy from more than 279,000 episodes*, termination success rates for 32J (~79% of 40J), monophasic shocks versus 40J biphasic shocks are estimated in Table 1. Termination success may vary depending on individual patient risk factors and medication use.

TABLE 1

	Normal Operation (40J, Biphasic delivery)	Second-phase SCP (32J, Monophasic delivery)
Estimated First Shock Success* (in VF Zone)	89%	85%
Estimated Cumulative Success Shocks 1-6*	99%	98%

*Medtronic data on file; May 2022.

- While 0.03% has been observed to date, Medtronic projects 0.18%** of the ~80,000 distributed devices may experience a second-phase SCP event within 24 months of service life, when considering the probability for these SCP events increases over time, and the likelihood a patient will need HV therapy during that time.

- For the population of patients who received HV therapy, the observed rate was 0.77%. When projecting for this population, the chance of encountering a second-phase SCP event is ~5.0%** at 24 months.

**The above projections are based on calculations without the planned device software update. Once installed, this update, in addition to the programming recommendations, will resolve occurrences of second-phase SCP events.

Potential harms related to a second-phase SCP event include failure to terminate the arrhythmia due to reduced-delivered-energy, a theoretical risk of proarrhythmia, and complications associated with device replacement, including unnecessary lead replacement due to misinterpretation of the SCP alert.

- **While not observed clinically**, Medtronic estimates the risk for proarrhythmia is 0.002% in the AX>B configuration, and improbable in the B>AX configuration (less than 0.00004%), with Active Can pathway enabled. These risks may be higher when Active Can is disabled.
- The overall risk for **patient mortality due to this issue is estimated to be 0.002%** at 24 months when combining the likelihood a patient will need therapy with the probability an arrhythmia fails to terminate after six sequences of 32J monophasic shocks.
    - Comparatively, the risk of **patient mortality due to complications associated with device replacement is 0.032% - 0.043%**[1,2,3]

PATIENT MANAGEMENT RECOMMENDATIONS AND CONSIDERATIONS:

SCP events are evident to the patient and clinician. Devices will issue an audible tone and, for patients enrolled in CareLink, a wireless CareAlert will report *RV Defib lead impedance 0 ohms*.

Medtronic recognizes that each patient requires unique clinical considerations. Based on internal investigation and external consultation with our Independent Physician Quality Panel (IPQP), Medtronic recommends:

- **Prophylactic device replacement is NOT recommended.**
- Remote monitoring with normal frequency of follow-up per clinic protocol, with patients' next follow-up scheduled in-clinic to allow for device reprogramming (if necessary):
    - **Programming all HV therapies to 40J with a B>AX pathway and Active Can/SVC Coil set with Active Can enabled across all therapy zones.**
- Contact Medtronic Technical Services (1-800-723-4636) or your local representative if an *RV Defib Lead Impedance Alert* reporting zero (0) ohms is observed – as this is an indicator that an SCP event was detected during HV therapy.
    - Importantly, if the delivered energy during the episode is ~79% of the programmed energy AND the SCP alert indicates an RV Defib Lead impedance alert reporting exactly zero (0) ohms, this is an indication of a second-phase SCP event (as described in this letter) and not a lead issue.

- Consider device replacement only after observing and confirming the cause of an SCP event with a Medtronic representative, with the understanding a device has an ~81% probability of delivering subsequent reduced-energy shocks, and with the understanding an update for implanted devices is anticipated to be available beginning <third quarter/fourth quarter> of calendar year 2022.
  Note: The software update will require an additional in-clinic follow-up in order for it to be installed into a patient's device. The update will ensure the full shock energy is delivered in the presence of a secondary, low-level current pathway in the HV circuitry.
- After an SCP event, pacing, sensing, episode detection, and anti-tachycardia pacing (ATP) therapies are not impacted; additionally, HV charging, battery longevity and Bluetooth telemetry are not impacted.

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[1] Tarakji KG, et al. Antibacterial Envelope to Prevent Cardiac Implantable Device Infection. The New England Journal of Medicine. 2019; 380(20):1895-1905.

[2] Medtronic Data on File. MDT2260884-CRHF CIED Infection Report; Agile: MDT2260884, Version 2.0, 11/02/2015.

[3] Birnie D, et al. Complications associated with defibrillation threshold testing: The Canadian experience. Heart Rhythm. 2008; 5(3):387-90.

Software Update Available to Correct Potential for SmartSync Telemetry Error

CareLink SmartSync™ Device Manager supporting Cobalt™ and Crome™ ICDs and CRT-Ds

Original Date of Communication: April 2022

STATUS UPDATE - APRIL 2024

As of 03 April 2024, Medtronic has received 217 reports of the SmartSync Telemetry Error in Cobalt and Crome devices. No serious adverse events or permanent harms have been reported.

ORIGINAL COMMUNICATION – APRIL 2022

Medtronic is notifying health care professionals of **a software update for CareLink SmartSync™ Device Managers** (SmartSync) that will address a telemetry error that may occur with Medtronic Cobalt™ and Crome™ implantable cardioverter defibrillators (ICDs) and cardiac resynchronization therapy defibrillators (CRT-Ds). Specifically, **software application D00U005 version 6.0.3 will deploy an update** to implanted devices that will correct the potential for temporary suspension of some device features (details below) due to a telemetry error involving inductive (non-Bluetooth) telemetry. As of 22 March 2022, 0.3% of devices have experienced this issue. No serious adverse events or permanent harms have been reported due to this error.

Medtronic representatives will work with you to ensure all SmartSync tablets in your facility are updated with application software D00U005 version 6.0.3 or higher. Once the software has been installed on a tablet, a patient's device will automatically receive an update (to prevent the telemetry error) during their next SmartSync session.

Details:

Some Cobalt and Crome devices may encounter a persistent "session-active" flag following the use of inductive telemetry. The persistent session-active flag is the result of a telemetry connection error that can occur when intermittent or disrupted signals manifest while communicating with the device at the end of the telemetry session. Inductive telemetry with a Cobalt/Crome device typically occurs during device interrogation with a CareLink Express™ Mobile reader head. A persistent session-active flag will result in temporary suspension of the following features (if available in the device) until the flag is cleared:

- Battery voltage measurements
- Capture Management™

- Atrial Lead Position Check™
- AdaptivCRT™, EffectivCRT™ diagnostic, and EffectivCRT™ During AF
- Wavelet™ template management
- Battery conditioning charges

Potential risks include loss of pacing or inadequate CRT support, and/or loss of Recommended Replacement Time (RRT) indicator.

When battery measurements are suspended for more than seven days, the longevity estimator cannot calculate a value and the estimator will display a grey bar with "???." Longevity estimates will be unavailable for approximately 82 weeks. A device that experiences a persistent session-active flag can be manually cleared via a specific sequence of steps, using a non-Bluetooth SmartSync telemetry session. Contact Medtronic Technical Services at 800-723-4636 for further instruction. After the persistent flag is manually cleared, the above features will automatically be restored. Remaining longevity estimates will resume approximately 82 weeks after the date the flag is cleared. The issue is unlikely to result in clinical impact to the patient given the features listed above can be restored with an in-clinic SmartSync programmer session.

Devices manufactured after July 2021 have already received the software update and are not susceptible to the described behavior. Refer to Appendix A (below) for details on how to identify which Cobalt/Crome devices have already received the update.

Patient Management Recommendations:

We realize that each patient requires unique clinical considerations. In consultation with our Independent Physician Quality Panel (IPQP), Medtronic recommends continuing normal follow-up frequency per local clinic protocol.

Once the software is installed on a SmartSync tablet, please follow these recommendations:

- **Patients routinely seen in the clinic** will automatically receive the update during their next interrogation using an updated SmartSync tablet (D00U005 version 6.0.3 or higher). No additional programming of the device is required.
- **Patients followed remotely who do not have regularly scheduled in-clinic sessions** should have their next follow-up session conducted in clinic using an updated SmartSync tablet (D00U005 version 6.0.3 or higher). No additional programming of the device is required.

Note: If a patient's device displays a grey longevity estimator bar with "???," the device may have a persistent session-active flag. Contact Medtronic Technical Services at 800-723-4636 for assistance.

APPENDIX A

How to Confirm a Patient's Device Has Received the Update?

Each device will display a Device Configuration ID after interrogation by an updated SmartSync tablet, or after transmitting to CareLink. The Device Configuration ID can be found via the Parameters Report as noted below:

For SmartSync – the following is available from the Parameters Report PDF file.

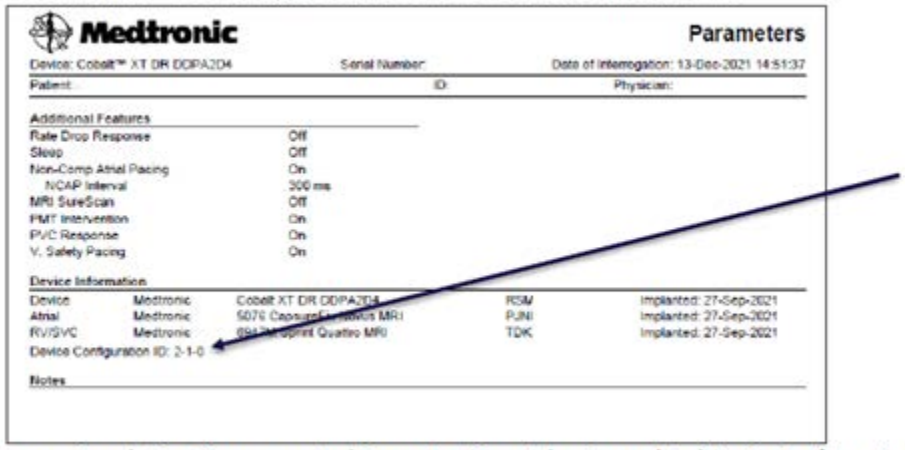


Image: Sample SmartSync-generated Parameters Report showing updated Device Configuration ID.

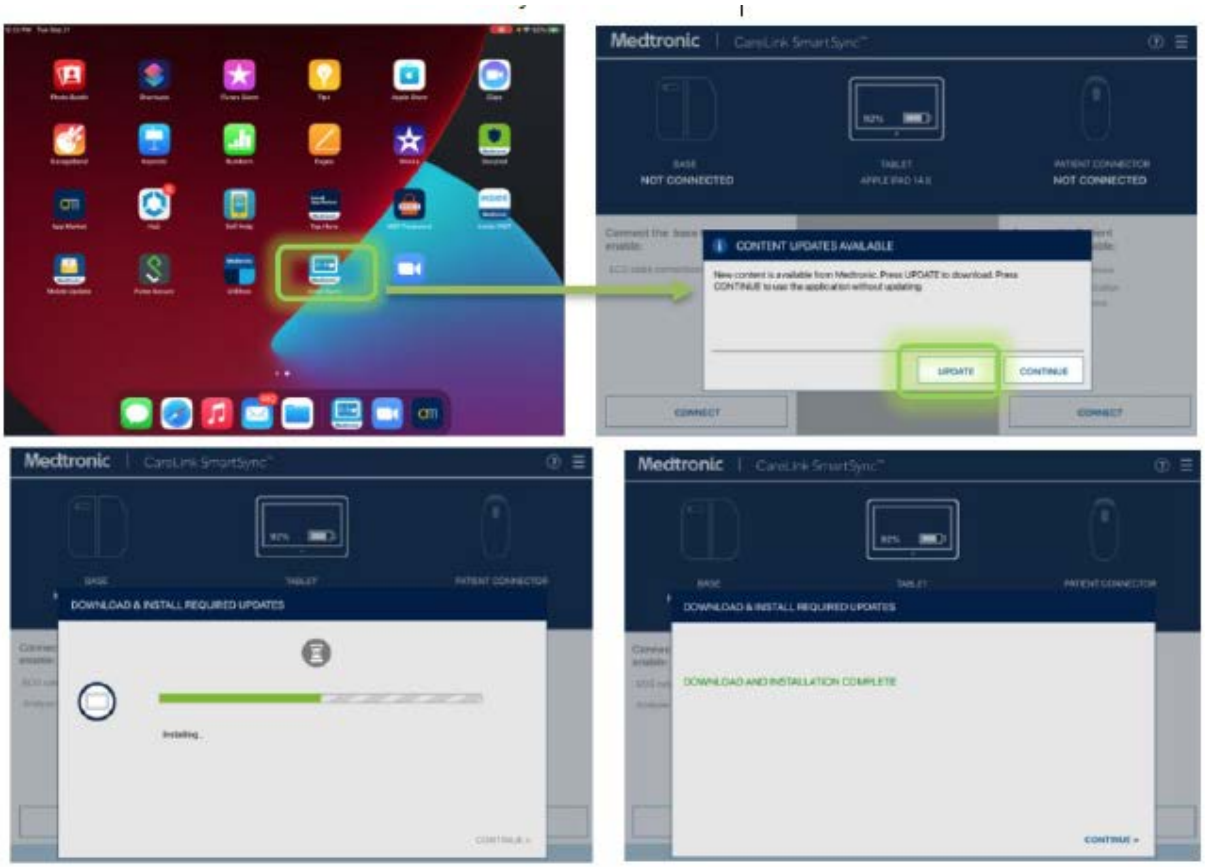
For CareLink – the following is available from the Transmission Details page by selecting 'More Reports' > 'Parameters.'

Image: Sample CareLink Parameters Report showing updated Device Configuration ID.

How do I update my SmartSync™ application software for the issue described in the April/May 2022 communication?

On any tablet, you can update to the most recent version for all applications resident on that tablet by simply connecting to the internet and either automatically discover if new software is available by launching the SmartSync App (see images below), OR manually discover if new software is available by navigating to the Software Information

screen and perform "Check for Updates." Contact your local Medtronic representative or Medtronic Technical Services at 800-638-1991 if you need assistance.



How do I confirm if a SmartSync tablet has already been installed with the updated software?

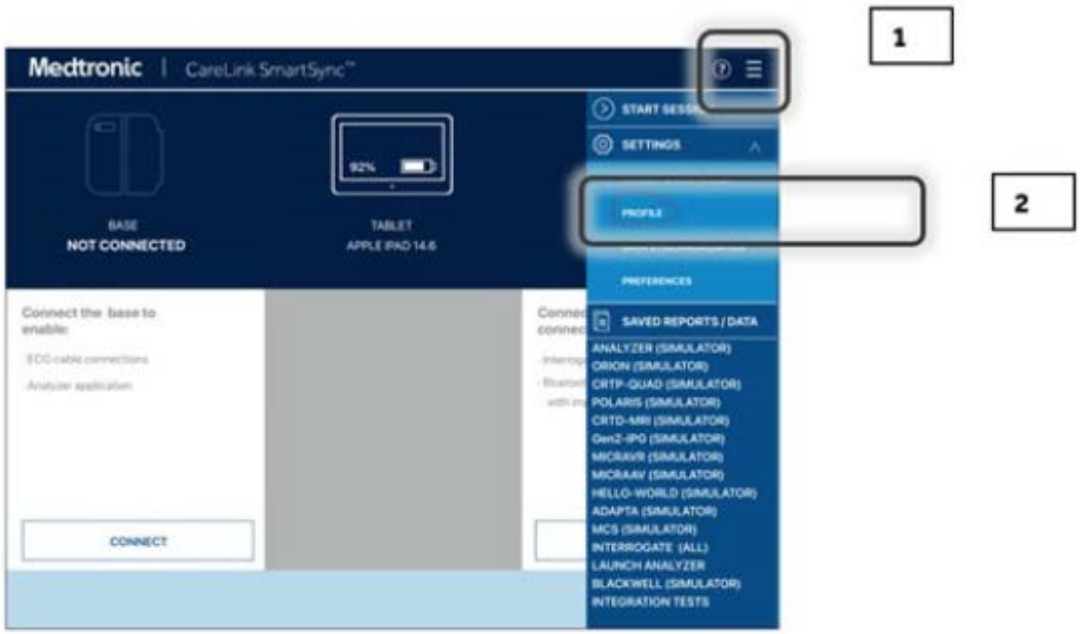
On any tablet, you can confirm the application software version for any device family by:

1. Selecting the MENU in the upper right corner of the SmartSync App [1]
2. Selecting PROFILE [2]
3. Selecting the SOFTWARE tab and scrolling through the SOFTWARE INFO list [3]

If the software update for this issue has already been installed, you will see the following versions listed:

- The Common/Platform application version is 3.6.4 (or higher)
- is 6.0.3 (or higher)

Customer Communications



3 - Updated application versions

Procedure Education Brief: Micra TPS Implant

Micra TPS devices

Original Date of Communication: November 2021

Overview

This Medtronic Procedure Education Brief provides a reminder of specific implant procedure safety recommendations included in the current labeling for Micra™ VR and Micra™ AV Transcatheter Pacing System (TPS) specifically from the Micra Instructions for Use (IFU) and the Micra implanter training program. Following instructions provided in the IFU and implanter training can reduce the risk of cardiac perforation, especially considerations for delivery system steering, repositioning the device, and patient selection.

Micra IFU and Implant Procedure Training

The Micra IFU is available on the Medtronic electronic manuals website (https://manuals.medtronic.com/manuals/main/region). Implanter training material for implanters who have attended training, and been certified to implant Micra TPS, can be found on the Medtronic Academy website. These instructional materials provide recommendations that limit implant complications such as:

- patient selection considerations to minimize perforation risk
- steering the delivery system with the use of fluoroscopy
- identifying implant location at the right ventricular septum with the use of contrast-enhanced fluoroscopy
- confirming position on the septum with contrast-enhanced fluoroscopy prior to deployment
- considerations for repositioning the device
- ensuring attending staff are prepared to manage pericardial effusion and tamponade, including immediate access to echocardiography equipment and availability of a pericardiocentesis kit
- recognizing clinical signs and symptoms of pericardial effusion and tamponade in order to minimize clinical response time
- preparedness for cardiac surgical intervention

Micra Safety and Effectiveness Data

On 17 November 2021, the US FDA posted a Letter to Healthcare Providers (*Leadless Pacing Systems: Risk of Major Complications Related to Cardiac Perforation During Implantation - Letter to Health Care Providers*) reminding physicians about the rare but possible risk of cardiac perforations associated with leadless pacemaker implantation. They reiterated the specific recommendations from Medtronic Micra implant training and IFU (reviewed above). This communication can be found here: https://www.fda.gov/medical-devices/medical-device-safety/letters-health-care-providers.

While regulatory agencies and Micra implanters are aware that cardiac perforation is a known risk, the FDA Letter to Healthcare Providers included data for which implanters may be seeking additional context. The letter indicated that

risk of cardiac perforation between transvenous pacing implants and Micra implants are similar, and that Micra implant complication rates are within expectations. The letter also indicated that in some scenarios, when a perforation occurs with a Micra implant procedure, the severity of the perforation complications can be higher than when a perforation occurs with a transvenous implant procedure.

Data from our Global Complaint Handling database suggests that the Micra rate of perforation is 0.6% and the rate of perforation related death is 0.13% out of over 100,000 implants worldwide. The Micra real-world perforation rate is in-line with, or lower than, the perforation rate observed in pre-market or post-market clinical studies[1].

Since Micra received pre-market approval in 2016, Medtronic has continuously monitored its safety and effectiveness. Multiple studies have shown that Micra has a high rate of implant success (exceeding 99%)[2,3]. Additionally, in the global Micra Investigational Device Exemption (IDE) Trial, Micra has been shown to reduce the risk for major complications compared to transvenous implants (through 12-months) by 48%[2], and in the global Micra Post Approval Registry by 63%[3].

Medtronic is further assessing the outcomes of Micra in the Micra Coverage with Evidence Development (CED) Study, which is a continuously enrolling, observational, cohort study evaluating complications, utilization, and outcomes of Micra.

Recent publications from the Micra CED Study in July 2021[4] and November 2021[5] based on 5,746 Micra patients and 9,622 with contemporaneously implanted transvenous single-chamber pacing patients show that at time of implant, Micra patients tend to be sicker than the transvenous single-chamber pacemaker population. Micra patients have a higher comorbidity burden as measured by the Charlson comorbidity index (5.1 vs 4.6, P<0.001) and a higher rate of end stage renal disease (12.0% vs 2.3%, P<0.001)[4]. Acute and longer-term outcomes reported in these publications are shown in the table below.

Measure	**Unadjusted Results** **(Micra vs Transvenous-VVI)**	**Results Adjusted for Patient Medical History** **(Micra vs Transvenous-VVI)**
Acute (30-day) device-related complications including dislodgement, infection, pocket complications[4]	1.4% vs 2.6% (P<0.001)	1.4% vs 2.5% (P<0.001)
Total acute (30-day) complications[4]	8.4% vs 7.3%(P=0.02)	7.7% vs 7.4% (P=0.49)
Cardiac perforation/effusion[4]	0.8% vs 0.4% (P<0.001)	0.8% vs 0.4% (P<0.001)
30-day all-cause mortality[5]	4.4% vs 3.8% (P=0.10)	4.0% vs 4.4% (P=0.60)

2-year reintervention rate[5]	3.0% vs 4.8% (P=0.006)	3.1% vs 4.9% (P=0.003)
2-year chronic complications[5]	4.9% vs 6.5% (P<0.001)	4.6% vs 6.5% (P<0.001)
2-year all-cause mortality[5]	34.0% vs 31.6% (P=0.002)	31.4% vs 32.5% (P=0.37)

Medtronic monitors and evaluates product performance and publishes device performance data on our product performance website http://productperformance.medtronic.com. In addition, Medtronic continues to collaborate with physicians and regulatory agencies to improve patient outcomes and clinical experience as part of our dedication to patient safety and product effectiveness.

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[1] Micra IDE: 1.8% (13/726), Micra post-approval registry 0.8% (15/1811), Micra Coverage with Evidence Development 0.8% (47/5746)

[2] Reynolds et al. *NEJM* 2016; 374(6): 533-541.

[3] El-Chami et al. *Heart Rhythm* 2018; 15(12): 1800-1807.

[4] Piccini et al. *JAMA Cardiology* 2021; 6(10): 1187-1195.

[5] El-Chami et al. *EHJ* 2021; ePub ahead of print

Reveal LINQ with TruRhythm - Brady & Pause Detections Disabled Following Electrical Reset

Reveal LINQ with TruRhythm Insertable Cardiac Monitoring Systems

Original Date of Communication: June 2021

STATUS UPDATE - APRIL 2024

This advisory is being addressed via a software update. Medtronic CareLink (2090) and Encore (29901) Programmer software, SW026 version 8.3, is available to correct a low rate of occurrence issue with Reveal LINQ ICMs (0.049%) where Brady and Pause detections are disabled following a partial electrical reset.

Reveal LINQ ICMs that are interrogated in-office with an updated 2090 or Encore programmer are no longer susceptible to this issue. This corrective fix to the device cannot be delivered with the Reveal LINQ™ Mobile Manager (LMM). Until the update is installed, future partial electrical resets may disable Brady and/or Pause detections as described in the June 2021 communication.

Note: The immediate availability of the software release is specific to countries that follow FDA approval, or that do not require software to be regulated. Release timing may differ for other geographies including those that require CE Mark approval. Check with your local Medtronic representative to determine if the software update is available in your region.

Please work with your local Medtronic Representative to update all 2090 and Encore device programmers. In addition, Medtronic requests you follow the below patient management recommendations:

Patient Management Recommendations:

- Reveal LINQ ICMs with a confirmed partial electrical reset will receive the corrective fix for this issue immediately by the device clinician completing the following steps:
    1. Interrogate the ICM with an updated 2090 or Encore programmer (software application SW026 version 8.3). The corrective fix is automatically installed during initial interrogation. To confirm an ICM has successfully received the update, refer to Appendix A.
    2. Per the Instructions for Use (IFU), following any electrical reset, verify ICM parameters are set appropriately for the patient and reprogram if necessary.
- For Reveal LINQ ICMs that have not experienced a partial electrical reset, an update will occur during the next in-clinic visit in which an updated Model 2090 or Encore programmer installed with software application SW026 version 8.3 (or higher) is used to interrogate the ICM. Partial electrical resets will disable Brady and/or Pause detections as described in the June 2021 communication until the update is installed on to the patient's ICM.

- For patients who are actively followed on CareLink, continue routine monitoring for CareAlerts and verify notification settings for electrical resets.
- Per the IFU, notify your Medtronic representative if an electrical reset occurs. If a partial electrical reset is confirmed, the patient's ICM will require reprogramming.
- During the programmer session, the corrective fix will be installed automatically.

ORIGINAL COMMUNICATION - JUNE 2021

This notice is to inform you that Reveal LINQ with TruRhythm ICMs that undergo a partial electrical reset appear to be programmed "ON," but are no longer able to detect and report Brady and Pause events to clinicians. Medtronic estimates that 0.049% of Reveal LINQ with TruRhythm ICMs have experienced a partial electrical reset resulting in the inability to detect Brady and Pause events. While there is a potential for underreporting due to lack of awareness that an electrical reset has occurred, there have been zero (0) serious or permanent harms or deaths reported as a result of this issue. After a partial electrical reset, these Brady and Pause episode types will not be reported to the clinician.

- Currently implanted/distributed Reveal LINQ with TruRhythm ICMs will receive a future software update to correct this issue delivered via the Model 2090 and Encore™ programmers. The corrective fix is anticipated to be available late calendar year 2021 (U.S.). Availability of the software will be communicated once Medtronic has obtained the necessary regulatory approvals.
- There will be an update for future manufactured Reveal LINQ with TruRhythm ICMs, which is anticipated to be available in the U.S. October 2021. Medtronic will inform physicians once this manufacturing update is implemented into newly manufactured Reveal LINQ with TruRhythm ICMs.

ISSUE DESCRIPTION

Medtronic has identified that Reveal LINQ with TruRhythm ICMs that undergo a partial electrical reset appear to be programmed "ON," but are no longer able to detect and report Brady and Pause events. A partial electrical reset is normal behavior that can occur when the device detects a possible issue with the device software. However, an error in the partial electrical reset implementation is causing this unintended behavior.

All Reveal LINQ with TruRhythm ICMs currently in distribution are susceptible to this issue. Through 10 May 2021, Medtronic has received 87 complaints related to an electrical reset. The projected rate of a Reveal LINQ with TruRhythm ICM experiencing a partial electrical reset that results in the inability to detect Brady and Pause events is 0.056% at 36 months. Complaint data suggests the majority of electrical resets were associated with Electromagnetic Interference (EMI) due to cardioversion or electrocautery. Potential harms include those associated with the risk of a delayed medical intervention or missed diagnosis for Brady and Pause events, and an explant procedure.

If a partial electrical reset occurs, CareLink™, Model 2090 and Encore programmer software and Reveal LINQ™ Mobile Manager (LMM) will continue to indicate that detection parameters are "ON;" however, Brady and Pause

events will not be automatically collected. The Patient Assistant (Patient Activator) will continue to function to manually trigger ECG collection, store the tracing, and mark symptoms.

Tachy and AT/AF detections are not affected by a partial electrical reset.

HOSPITAL RISK MANAGER ACTIONS (U.S. CUSTOMERS ONLY)

1. Please share this notification with the Cardiology and cardiac monitoring departments, Pacemaker/Device Clinic leadership, and physicians who implant or manage patients with LINQ II insertable cardiac monitors (ICMs).
2. Complete the enclosed Confirmation Form and email to RS.CFQFCA@medtronic.com

PATIENT MANAGEMENT RECOMMENDATIONS

If an electrical reset has never occurred, all detection criteria are being monitored and recorded as programmed. Continue with normal follow-up per local clinic protocols for these patients.

Identifying if an electrical reset has occurred:

For patients who are actively followed on CareLink in the U.S: During our investigation of this issue, we identified patients whose device showed evidence of a partial electrical reset as of 10 May 2021. For those clinicians with identified patients, a supplemental letter was provided. If you have not received a supplemental letter, then none of your patients who are actively transmitting on CareLink were identified as having a recorded electrical reset event during our investigation.

All patients, including those on CareLink, should be carefully monitored for reports of an electrical reset condition. Follow instructions below.

- **During in person or remote follow-up:** If a device experiences an electrical reset, clinicians will be informed via programmer pop-up or CareLink display message. Actively monitor for these notifications at each patient follow-up, and contact Medtronic Technical Services should you receive an alert. Note: Once cleared, electrical reset notifications are no longer accessible.
- **Retroactively:** Review the Brady lifetime episode counter from the most recent session report (CareLink or in-office). If a report is not available, consider scheduling a follow-up for each patient being monitored for Brady or Pause events. Review the Brady lifetime episode counter:
    - If the lifetime count for Brady is non-zero, a partial electrical reset has **not** occurred.
    - If the lifetime count for Brady is zero, and the Brady detection parameter indicates it is "ON," a partial electrical reset **may** have occurred. Contact Medtronic Technical Services for assistance by emailing RS.LINQElectricalResetFCA@medtronic.com (U.S.) OR calling 1-800-929-4043 (U.S.).

Patients with a confirmed partial electrical reset:

- Medtronic medical staff, in consultation with our Independent Physician Quality Panel, recommends against device replacement for patients being monitoring for Tachy or AT/AF; continue normal patient follow-up.
- When monitoring for Brady or Pause events, it is important to note that the Patient Assistant (Patient Activator) will continue to manually mark symptoms even after a partial electrical reset. Patient-activated recordings are not impacted by this issue. If patients require monitoring for Brady and/or Pause events, and it is not acceptable to wait for the software update to become available (see details below), consider device replacement. Recognize that exposure to EMI could introduce this issue for new device implants that occur before the manufacturing update is implemented anticipated in the U.S. in October 2021.
- As a reminder, per the Reveal LINQ with TruRhythm ICM's Instructions for Use, contact Medtronic anytime an electrical reset occurs.

FUTURE SOFTWARE UPDATE AVAILABILITY

Medtronic is developing a programmer-delivered software update to correct this issue for Reveal LINQ with TruRhythm ICMs currently implanted or in distribution. Anticipated availability in the U.S. is late calendar year 2021; Medtronic representatives will inform you of the availability and work with you to install the software onto clinic and hospital 2090 and Encore programmers. LMM application software will be unable to deliver the software update for this issue. In order for patients with Reveal LINQ with TruRhythm ICMs to receive the update, the device will need to be interrogated with an updated 2090 or Encore programmer.

APPENDIX A

Reveal LINQ™ with TruRhythm™ Insertable Cardiac Monitoring Systems

Brady & Pause Detections Disabled Following Partial Electrical Reset

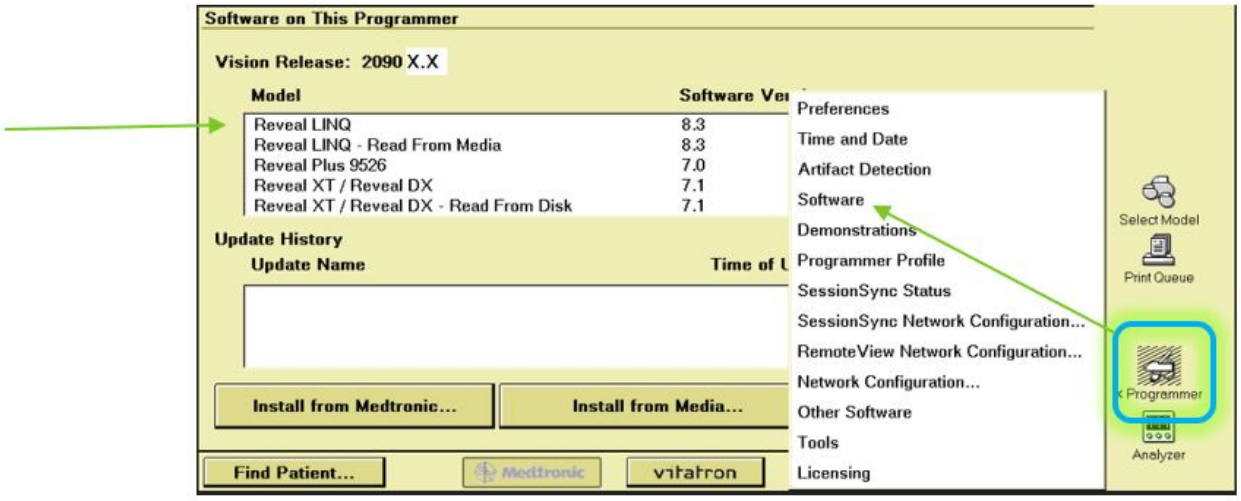
Software Update Available

How do I update my Model 2090 and Encore programmers with the Reveal LINQ with TruRhythm software described in the November 2021 communication)?

Software update SW026 version 8.3 can be installed onto all Model 2090 or Encore programmers through either the Medtronic Software Distribution Network (SDN) or via a USB. Medtronic representatives will work with you to install the software.

How do I confirm if a Model 2090 or Encore programmer has already been installed with the updated software (SW026 v8.3)?

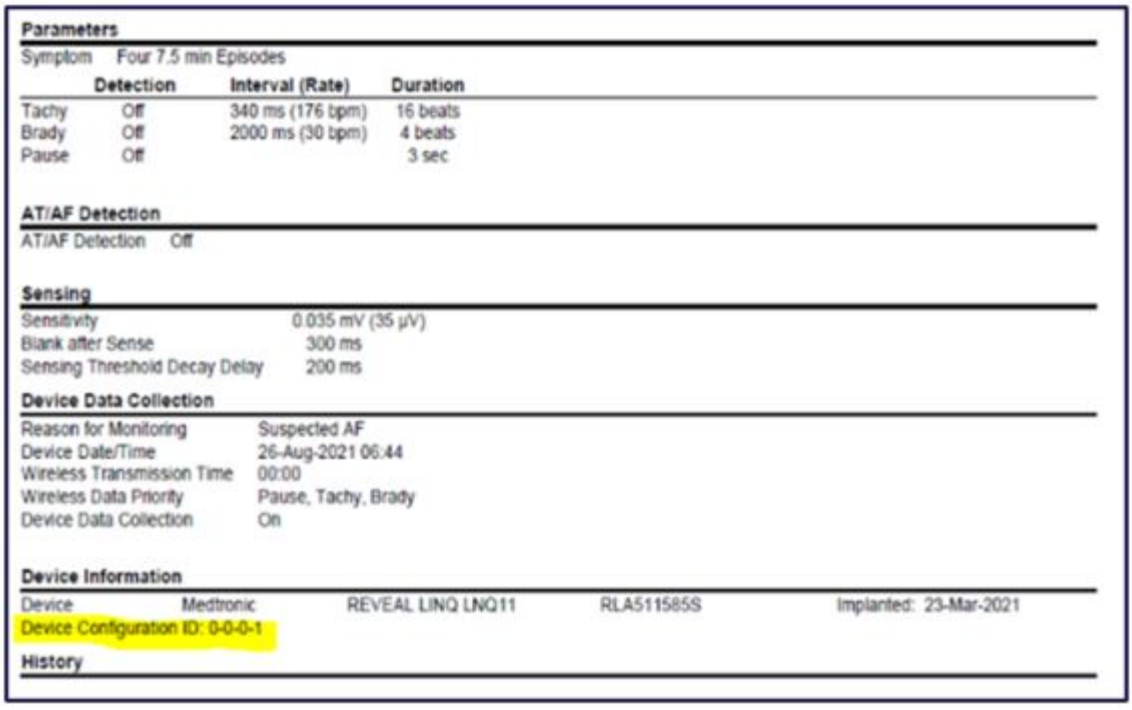
From the *Find Patient* screen on the programmer, Tap the Programmer Icon, select "Software," and scroll through the list of installed applications to find Reveal LINQ Software Version 8.3.



How do I confirm if a patient's Reveal LINQ ICM has received the software update?

Clinicians can confirm if a patient's ICM has received the software update by verifying the Device Configuration ID via a 2090 or Encore programmer (LMM will not display the Configuration ID). To locate the Device Configuration ID, enter a follow-up session and Print the Parameters Report. All Reveal LINQ ICMs that have received the software update will have their Configuration ID ending in a "1" (e.g. X-X-X-1).

NOTE: The Reveal LINQ Device Configuration ID can be viewed on CareLink beginning January 2022 after a manual transmission is completed by the patient.



LINQ II - Brady, Pause and PVC Detections Disabled Following Electrical Reset

LINQ II Insertable Cardiac Monitoring Systems

Original Date of Communication: June 2021

STATUS UPDATE - APRIL 2024

Medtronic released a software update in August 2023 to address this issue in LINQ II ICMs manufactured from July 2020 to June 2021. The update is available through SmartSync App 3.12.4 or higher.

Medtronic implemented a manufacturing update to all newly manufactured LINQ II ICMs released into distribution to prevent a partial electrical reset from disabling Brady, Pause and PVC event detection.

Updated LINQ II ICMs can be identified, before being implanted, by the GTIN that is printed under the barcode on the box. The new U.S. LINQ II GTIN ends with "002."

As a reminder, unused LINQ II devices manufactured prior to June 2021 were requested to be returned to Medtronic per the Original advisory (dated June 2021) – these devices cannot be updated in the field and will continue to be susceptible to the issue.

ORIGINAL COMMUNICATION - JUNE 2021

This notice is to inform you that LINQ II insertable cardiac monitors (ICMs) that undergo a partial electrical reset appear to be programmed "ON," but are no longer able to detect and report Brady, Pause and PVC events to clinicians. Medtronic estimates that 0.21% of LINQ II ICMs have experienced a partial electrical reset resulting in the inability to detect Brady, Pause and PVC events. While there is a potential for underreporting due to lack of awareness that an electrical reset has occurred, there have been zero (0) serious or permanent harms or deaths reported as a result of this issue. After a partial electrical reset, these Brady, Pause and PVC episode types will not be reported to the clinician.

- A correction for currently implanted LINQ II ICMs is not available.
- We are requesting that hospitals quarantine all LINQ II ICMs on hospital shelves. Physicians should cease implanting any remaining LINQ II ICMs that may remain in shelf stock and return any unused product to Medtronic.
- There will be an update for future manufactured LINQ II ICMs, which is anticipated to be available in the U.S. July 2021.

This letter contains a description of the information known to date and patient management recommendations.

ISSUE DESCRIPTION

Medtronic has identified that LINQ II ICMs that undergo a partial electrical reset appear to be programmed "ON," but are no longer able to detect and report Brady, Pause, and PVC events. A partial electrical reset is normal behavior that can occur when the device detects a possible issue with the device software. However, an error in the partial electrical reset implementation is causing this unintended behavior.

All LINQ II ICM devices currently in distribution are susceptible to this issue. Through 10 May 2021, Medtronic has received 37 complaints related to an electrical reset. The projected rate of a LINQ II ICM experiencing a partial electrical reset that results in the inability to detect Brady, Pause, and PVC events is 0.73% at 36 months. Complaint data suggests the majority of electrical resets were associated with Electromagnetic Interference (EMI) due to cardioversion or electrocautery. Potential harms include those associated with the risk of a delayed medical intervention or missed diagnosis for Brady, Pause, and/or PVC events, and an explant procedure.

If a partial electrical reset occurs, CareLink™ and Reveal LINQ™ Mobile Manager (LMM) will continue to indicate that detection parameters are "ON;" however, Brady, Pause, and PVC events will not be automatically collected. The Patient Assistant (Patient Activator) will continue to function to manually trigger ECG collection, store the tracing and mark symptoms.

Tachy and AT/AF detections are not affected by a partial electrical reset.

HOSPITAL RISK MANAGER ACTIONS (U.S. CUSTOMERS ONLY)

Medtronic is requesting customers with affected product on hand to take the following actions:

1. Identify and quarantine all unused affected Medtronic LINQ II ICMs.
2. Return all unused affected product in your inventory to Medtronic. Contact Medtronic Customer Service at 1-800-848-9300 to initiate a product return. Your local Medtronic Representative can assist you as necessary in initiating the return of this product.
3. Please share this notification with the Cardiology and cardiac monitoring departments, Pacemaker/Device Clinic leadership, and physicians who implant or manage patients with LINQ II insertable cardiac monitors (ICMs).
4. Complete the enclosed Confirmation Form and email to RS.CFQFCA@medtronic.com

PATIENT MANAGEMENT RECOMMENDATIONS

If an electrical reset has never occurred, all detection criteria are being monitored and recorded as programmed. Continue with normal follow-up per local clinic protocols for these patients.

Identifying if an electrical reset has occurred:

For patients who are actively followed on CareLink in the U.S: During our investigation of this issue, we identified patients whose device showed evidence of a partial electrical reset as of 10 May 2021. For those clinicians with identified patients, a supplemental letter was provided. If you have not received a supplemental letter, then none of your patients who are actively transmitting on CareLink were identified as having a recorded electrical reset event during our investigation.

All patients, including those on CareLink, should be carefully monitored for reports of an electrical reset condition. Follow instructions below.

- **During in person or remote follow-up:** If a device experiences an electrical reset, clinicians will be informed via programmer pop-up or CareLink display message. Actively monitor for these notifications at each patient follow-up, and contact Medtronic Technical Services should you receive an alert. **Note**: Once cleared, electrical reset notifications are no longer accessible.
- **Retroactively:** Review the Brady lifetime episode counter from the most recent session report (CareLink or in-office). If a report is not available, consider scheduling a follow-up for each patient being monitored for Brady, Pause or PVC events. Review the Brady lifetime episode counter:
    - If the lifetime count for Brady is non-zero, a partial electrical reset has **not** occurred.
    - If the lifetime count for Brady is zero, and the Brady detection parameter indicates it is "ON," a partial electrical reset **may** have occurred. Contact Medtronic Technical Services for assistance by emailing RS.LINQElectricalResetFCA@medtronic.com (U.S.) OR calling 1-800-929-4043 (U.S.).

Patients with a confirmed partial electrical reset:

- Medtronic medical staff, in consultation with our Independent Physician Quality Panel, recommends against device replacement for patients being monitoring for Tachy or AT/AF; continue normal patient follow-up.
- When monitoring for Brady, Pause, or PVC events, device replacement may be appropriate. Consider the following before device replacement:
    - It is important to note that the Patient Assistant (Patient Activator) will continue to manually mark symptoms even after a partial electrical reset. Patient-activated recordings are not impacted by this issue.
    - If replacement is desirable, consider Reveal LINQ with TruRhythm™ or alternative ICM. While Reveal LINQ devices are also are susceptible to this issue (see correction notice, *Reveal LINQ™ with TruRhythm™ Insertable Cardiac Monitoring Systems Brady & Pause Detections Disabled Following Partial Electrical Reset*), the observed rate is 0.049% for Reveal LINQ with TruRhythm ICMs compared to 0.21% for LINQ II ICMs.

Note: Implanted Reveal LINQ with TruRhythm ICMs have the ability to receive a future software update to correct this issue, which will be implemented via the Model 2090 and Encore™ programmers, and is anticipated to be available in the U.S. late calendar year 2021.

- Future manufactured LINQ II devices will have a correction for this issue implemented during manufacturing pending regulatory approval of the corrective fix, but initial supply may be limited.

- As a reminder, per the LINQ II ICM's Instructions for Use, contact Medtronic anytime an electrical reset occurs.

Unipolar Longevity Estimation Software Error

Azure/Astra DR and SR Pacemakers and Percepta/Serena/Solara CRT-Ps

Original Date of Communication: April 2021

STATUS UPDATE - APRIL 2024

Through 25 March 2024, Medtronic has received 34 complaints from clinicians related to this issue. No permanent patient harms have been reported due to this issue.

ORIGINAL COMMUNICATION - APRIL 2021

This notice is to inform you of the availability of software updates to address a potential inaccurate longevity estimate that may occur with the Azure™ and Astra™ family of pacemakers (IPGs) and the Percepta™, Serena™, Solara™ family of cardiac resynchronization therapy pacemakers (CRT-Ps). A longevity estimation error may occur in the early years of device life when a unipolar pacing vector is programmed in the right atrial (RA) lead and/or the right ventricular (RV) lead. No other device features or therapies are impacted. For devices programmed to bipolar pacing in both the RA and RV chambers, the longevity estimates are not affected by this issue.

Through 05 March 2021, Medtronic has received 13 complaints from clinicians related to this issue. No permanent patient harms have been reported due to this issue. If the software update is not applied to the programmer, confusion regarding device longevity could lead to a missed RRT alert and a potential delayed intervention. Battery performance is not affected by this programmer display error. RRT will alert appropriately, and if patients are followed per standard clinical practice, the risk to patients is minimal.

The longevity estimation error associated with unipolar pacing configurations occurs only in the first half of the device life (prior to 50% depletion of the battery). During this phase, the estimator algorithm utilizes lead impedance as an input. When a unipolar pacing configuration is programmed, the algorithm incorrectly uses the bipolar lead impedance as input (rather than the appropriate unipolar pacing lead impedance). As a result, the algorithm will over-estimate the remaining longevity during this phase. At all times, RRT, Elective Replacement Indication, and End of Service will accurately display on programmers – even if the software update has not yet been installed.

Software updates are now available for Medtronic model 2090, Model 29901 Encore programmers, and SmartSync to correct this programmer display issue (see Table 1 below).

Medtronic 2090 and Encore Programmer Software Update	Medtronic SmartSync Software Update
Azure™/Astra™ (SW030) v 8.2 Percepta™/Serena™/ Solara™ (SW040) v 8.4	Azure™/Astra™ (D00U003) v 4.0 Percepta™/Serena™/ Solara™ (D00U004) v 4.0

Table 1: Software updates by device family and programmer

Customer Communications

As of 26 March 2021, Medtronic CareLink network has been updated and will display correct longevity estimates for devices affected by this issue. Azure IPG and Percepta/Serena/Solara CRT-P patients remotely monitored via the MyCareLink Heart™ mobile app will automatically receive an updated longevity estimate on their mobile app with their next scheduled transmission or within 92 days of their last longevity update, whichever occurs first.

No change in patient management is necessary. Per labeling, the RRT notification can be used to identify when device replacement should be scheduled. There is no need to schedule patients to come in before their next regularly scheduled follow-up visit. The corrective fix for this error is implemented in programmers and the CareLink network. The patient's implanted device does not require an update.

Based on your facility's needs and accessibility, a Medtronic Representative or authorized personnel will assist with installing software on programmers in your account. Until all SmartSync and Model 2090 and Encore programmers are updated, a difference in longevity estimates may be displayed between programmers and the CareLink network due to this software error.

Potential for Shortened RRT-to-EOS in Subset of ICDs and CRT-Ds

Subset of ICDs and CRT-Ds

Original Date of Communication: February 2021

STATUS UPDATE - APRIL 2024

As of 18 March 2024, approximately 167,713 devices susceptible to this issue are estimated to still be active worldwide. Observed rate of occurrence is 0.16% and projected rate for the affected population of devices remains 0.22%. Devices with higher pacing outputs and high pacing percentages (e.g., CRT-D devices) have the lowest probability of occurrence (refer to Appendix A of the original communication for further details – see below). No permanent patient harms have been reported due to this issue.

ORIGINAL COMMUNICATION – FEBRUARY 2021

In February 2021, Medtronic informed physicians of a potential issue for a subset of Implantable Cardioverter Defibrillators (ICDs) and Cardiac Resynchronization Therapy Defibrillators (CRT-Ds). Medtronic has identified that a small percentage of implanted cardiac devices, from a well-defined subset, may experience a shortened Recommended Replacement Time (RRT) to End of Service (EOS) interval following an earlier-than-expected RRT observation. The subset of ICDs and CRT-Ds affected by this issue were last implanted in February 2019 and manufactured with a specific battery design that is no longer being distributed.

We have received no reports of permanent harm to patients as a result of this issue.

Approximately 339,900 devices susceptible to this issue are estimated to still be active worldwide. Through 4 January 2021, confirmed events (observed rate 0.07%) have involved a rapid drop in battery voltage ranging from days to months, with unexpected RRT as one of the primary reported observations. For those devices in which RRT triggered earlier than expected, the median time from RRT to the EOS observation was 14 days. In a small number of the cases, no output/no telemetry was reported prior to device replacement. Medtronic projects approximately 0.22% of the affected device population may experience this issue during their service life.

The rapid depletion is caused by a latent shorting mechanism involving lithium plating, resulting from a thermal gradient between the anode and cathode components of the battery. **Devices with higher pacing outputs and high pacing percentages (e.g. CRT-D devices) have the lowest probability of occurrence (refer to Appendix A – see below)**. Conversely, devices with low current drain (evidenced by a longer overall service time from implant to RRT) have a higher probability of experiencing this issue. Importantly, the probability of this issue developing is constant after approximately three years of service time.

Patient Management Guidance

We realize that each patient requires unique clinical considerations. In consultation with our Independent Physician Quality Panel (IPQP), Medtronic **recommends** the following:

- **Continue normal follow-up per local clinical protocol.**
    - Recognize that patients who require significant pacing support and high voltage therapy have the lowest risk for this issue - See Appendix A for additional details.
    - Where possible, take advantage of the CareLink™ home monitoring system and the wireless low battery voltage CareAlert.
    - The low battery voltage audible alert is shipped On with high-urgency tones; Remind patients to contact their clinic if they hear an audible alert, particularly since patients may be opting to delay clinic visits due to COVID-19 guidance.
    - Inform a Medtronic Representative of any unexpected device behaviors.
    - Be aware that the inability to interrogate the device, or to transmit data, may be an indicator that the device has experienced this issue.
- **If unexpected RRT is observed, prompt replacement of the device should occur commensurate with the underlying clinical situation of the patient:**
    - For non-pacing dependent patients or for primary prevention ICD patients, replacement within 1 week of an unexpected RRT notification is recommended.
    - For pacing dependent patients, immediate replacement is recommended following an unexpected RRT notification.

    Note: For all patients, this issue can also manifest as an unexpected change in the remaining longevity estimate that cannot be attributed to programming changes, or changes in use conditions.

Medtronic medical staff in consultation with the IPQP **recommends against prophylactic replacement** due to the low rate of occurrence and the low potential for permanent harm when prompt replacement occurs in response to an unexpected RRT.

Patients and clinicians may determine if a specific device is affected by looking up the serial number on Medtronic's Product Performance website: http://wwwp.medtronic.com/productperformance/

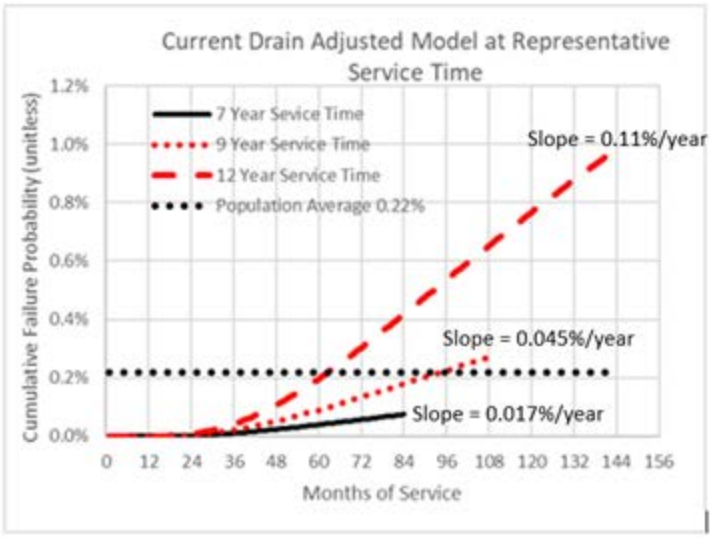
APPENDIX A

The table below provides a comparison of sample use conditions and their associated, projected service time (Implant to Recommended Replacement Time), along with their cumulative and per-year risk of encountering rapid depletion due to a latent shorting mechanism in the battery. Devices with higher pacing outputs and high pacing percentages have the lowest probability of occurrence. There have been no reports of permanent harm to patients as a result of this issue.

Probability (Risk per Year) of Rapid Depletion due to this Issue as a Function of Service Time

Projected Service Time * (based on sample programmed settings and use conditions)	Projected Risk per Year & Total Cumulative Risk at end of service time++	Notes/Example
12-year service time	0.11% per year, 0.98% cumulative	VR ICD patient with 0% pacing and no shocks delivered
10.25-year service time	0.070% per year, 0.50% cumulative	VR ICD patient with 50% pacing history and two (2) or fewer shocks per year
9-year service time	0.045% per year, 0.27% cumulative	DR ICD patient with little-to-no pacing history (e.g. 10%AP, 25%VP, and two (2) or fewer shocks per year)
8.25-year service time	0.033% per year, 0.18% cumulative	DR ICD patient with complete heart block (10% AP and 100% VP, and two (2) or fewer shocks per year)
7-year service time	0.017% per year, 0.075% cumulative	CRT-D patient with 15% AP, 90% RVP, 100% LVP, and two (2) or fewer shocks per year
* Assumes current drain remains stable throughout life of device (i.e. No change in remaining longevity due to reprogramming or changes in use conditions)	++ Per annum risk of issue becomes constant after approximately 3 years of service time. Cumulative risk = early risk plus annual risk over the projected service time.	A output = 1.5V, 0.4ms, 500 ohms RV output = 2.0V, 0.4ms, 500 ohms LV output = 2.5V, 0.4ms, 500 ohms Average pacing rate = 75 bpm

Customer Communications



Cumulative Probability is the expected risk for a device to experience this issue between implant and end of service. When risk is evaluated for a device that has reached a service life beyond 3 years, the remaining risk can be estimated based on the yearly risk value shown.

The Population Average (0.22%) is the cumulative probability for the full subset of devices susceptible to this issue. This value takes into account expected longevity and patient mortality. Not all devices with projected service time of 12 years will be in service all 12 years.

Key Points:
Slope of the curve reflects the risk per year based on sample service times of 7, 9, and 12 years.

Slope (risk per year) is constant after approximately 3 years of service time.

Performance Note: Potential for no output/no telemetry condition in subset of IPG and CRT-P products due to ceramic capacitor leakage pathway

Azure™ and Astra™ pacemakers, and Percepta™, Serena™ and Solara™ CRT-P

Original Date of Communication: May 2019

STATUS UPDATE - APRIL 2024

As of 19 March 2024, there have been a total of 29 confirmed events worldwide associated with this failure mode. No additional deaths, beyond the two deaths previously disclosed*, have been reported since the October 2020 update. Confirmed events included reports of no output, premature depletion and electrical reset that reverted to VVI 65 operation. The range of events have occurred between 2 and 53 months post-implant.

Medtronic's ongoing monitoring of these failures have allowed us to improve long-term modeling projections for future device failures. The overall projected lifetime rate of occurrence for the remaining active devices manufactured with the original low voltage capacitor is projected to be 0.025%.

All products in distribution are unaffected. The specific low voltage capacitor susceptible to this issue was last used in manufacturing 01 June 2019. Patient management recommendations remain unchanged from the original posting (refer to the May 2019 text below).

*Assessment for cause of death determined loss of pacing therapy could not be ruled out as a contributing factor.

ORIGINAL COMMUNICATION - MAY 2019

Medtronic has identified a rare but potentially serious failure mode in a population of Azure™ and Astra™ pacemakers, and Percepta™, Serena™ and Solara™ cardiac resynchronization therapy pacemakers (CRT-P), manufactured with a specific multilayer ceramic capacitor. These devices continue to perform within reliability projections.

While inherently very reliable, a known failure mode of these capacitors is the potential for internal cracking that can be caused by thermal-mechanical stress during manufacturing. Under rare conditions, internal cracking within a capacitor may result in the development of a leakage pathway, causing high current drain and leading to rapid battery depletion. While the issue presents as rapid battery depletion, this is not a battery performance issue.

As of April 26, 2019, three complaints out of ~266,700 devices distributed worldwide since February 2017, have been received that included a no output /no telemetry scenario resulting from rapid battery depletion. Battery depletion due to this issue can range from several days to several weeks. One of these reported events contributed to a patient

death. The three confirmed failures occurred within 9 months post implant. The projected rate for this issue is 0.0028%, with the most susceptible period for a leakage pathway to develop in the capacitor being the first 12 months post implant.

Based on the low predicted rate of failure and the recent implementation of process and component enhancements, Medtronic expects few, if any, additional events to occur. Medtronic, in consultation with our Independent Physician Quality Panel, does not recommend device replacement. Physicians should continue normal patient follow-up in accordance with standard practice, and where possible, continue to utilize the low battery voltage wireless CareAlert™ (shipped ON), together with remote monitoring via CareLink™ home monitor or the MyCareLink Heart™ mobile app. Per the instructions for use, at each follow-up, verify the status of the implanted system as well as the clinical effectiveness of the device. Pay attention to any unexpected changes in remaining longevity estimates or the inability to interrogate the device and/or transmit data.

Contact Medtronic Technical Services if you have concerns on a specific patient.

Brady Technical Services |rs.techservices@medtronic.com| 800-505-4636

Potential Conductor Wire Fracture

6930, 6931, 6948, 6949 Sprint Fidelis Defibrillation Leads

Original Date of Communication: October 2007

STATUS UPDATE - APRIL 2024

As of April 4, 2024, of the initial implant population of 205,600 in the United States, approximately 27,000 remain implanted. According to Product Surveillance Registry results, lead survival is estimated to be 63.5% (+6.6/-6.0%) at 180 months. As the implanted population ages and the sample size increases for each time interval, the accuracy of the estimated survival probability will increase as shown by tighter confidence intervals.

Initial Affected Population	Number of Confirmed Advisory Related Events	Estimated Remaining Active Population
279,500 Worldwide (**205,600** United States)	**7,329** Worldwide **(5,261** United States)	**37,000** Worldwide (**27,000** United States)

ORIGINAL COMMUNICATION - OCTOBER 2007

PRODUCT

All Model 6930, 6931, 6948, and 6949 implantable defibrillation leads

ADVISORY

There are two primary locations where chronic conductor fractures have occurred on Sprint Fidelis leads: 1) the distal portion of the lead, affecting the anode (ring electrode) and 2) near the anchoring sleeve tie-down, predominantly affecting the cathode (helix tip electrode), and occasionally the high voltage conductor. These two locations account for approximately 90% of the chronic fractures identified in Returned Product Analysis (RPA). The remaining 10% of chronic fractures occurred in the DF-1 connector leg and the proximal portion of the RV coil. High voltage conductor fractures could result in the inability to deliver defibrillation therapy. Anode or cathode conductor fractures (at either location) may present clinically as increased impedance, oversensing, increased interval counts, multiple inappropriate shocks, and/or loss of pacing output.

PATIENT MANAGEMENT RECOMMENDATIONS (UPDATED APRIL 2011)

The Lead Integrity Alert (LIA) provides three days advance notice prior to inappropriate therapy to 76% of patients with lead fractures[1]. As a result, we strongly recommend that all Sprint Fidelis patients who have the ability to upgrade to Lead Integrity Alert do so promptly. Also ensure that high voltage lead impedance alerts (maximum of 100 ohms) are programmed. When a lead fracture is suspected or confirmed, immediate patient attention is strongly recommended. Physicians should inform their patients to seek medical attention without delay if they experience unexpected shocks.

- **If a Fidelis lead fracture of any type has occurred, we recommend implanting a new high voltage lead with or without extraction of the Fidelis lead.**
- In patients with normal device function and no manifestation of lead fracture, no action is recommended. The risk of prophylactic intervention appears to be greater than serious injury resulting from lead fracture even for pacemaker dependent patients, except in select individual patient circumstances as determined by the physician.
- In the event of a device change-out or upgrade procedure, with no manifestation of lead fracture, consider the patient age and lead model data above, as well as patient life expectancy, co-morbidities, ease of extraction related to implant time, patient preference, etc., for the following options:
    - Leave a properly performing lead intact.
    - Implant a new ICD lead without extraction of the existing lead.
    - Carefully consider all factors before prophylactic placement of a pace-sense lead. Data shows an increased risk of high voltage conductor fracture if a pace-sense conductor fracture has previously occurred. This data is available here.
    - Individual patient circumstances may warrant extracting and implanting a new ICD lead. If warranted, Medtronic's Independent Physician Quality Panel recommends the lead extraction procedure be performed by a physician with extensive lead extraction experience.[2]

Footnotes:

1: Swerdlow C, Gunderson, B, et al."Downloadable Algorithm to Reduce Inappropriate Shocks Caused by Fractures of Implantable Cardioverter-Defibrillator Leads", Circulation, November 2008, 118: 2122-2129.

2: "Transvenous Lead Extraction: Heart Rhythm Society Expert Consensus on Facilities, Training, Indications, and Patient Management", Heart Rhythm, Vol 6, No 7, July 2009.

Legacy Models

Medtronic, at its discretion, may stop providing updated performance information on models in alignment with the inclusion criteria defined in the methods for estimating. Listed below are the final product performance reports for legacy models.

GENERATORS

Cardiac Resynchronization Therapy (CRT) Defibrillators

Product Name	Model	Final Issue
Cardia CRT-D	D384TRG	2023 2nd Edition (Issue 89)
Concerto CRT-D	C154DWK	2016 1st Edition (Issue 74)
Concerto CRT-D	C164AWK	2016 1st Edition (Issue 74)
Concerto CRT-D	C174AWK	2016 1st Edition (Issue 74)
Concerto II CRT-D	D274TRK	2023 2nd Edition (Issue 89)
Concerto II CRT-D	D294TRK	2023 2nd Edition (Issue 89)
Consulta CRT-D	D204TRM	2023 2nd Edition (Issue 89)
Consulta CRT-D	D214TRM	2023 2nd Edition (Issue 89)
Consulta CRT-D	D234TRK	2023 2nd Edition (Issue 89)
InSync II Marquis	7289	2012 1st Edition (Issue 66)
InSync Maximo	7303	2012 1st Edition (Issue 66)
InSync Maximo	7304	2016 1st Edition (Issue 74)
InSync Sentry	7297	2012 1st Edition (Issue 66)
InSync Sentry	7299	2016 1st Edition (Issue 74)
Maximo II CRT-D	D264TRM	2023 2nd Edition (Issue 89)
Protecta CRT-D	D334TRG	2023 2nd Edition (Issue 89)
Protecta CRT-D	D334TRM	2023 2nd Edition (Issue 89)
Protecta XT CRT-D	D314TRM	2023 2nd Edition (Issue 89)

Cardiac Resynchronization Therapy (CRT) Pacemakers

Product Name	Model	Final Issue
InSync	8040	2016 1st Edition (Issue 74)
InSync III	8042	2023 2nd Edition (Issue 89)

Implantable Cardioverter Defibrillators (ICDs)

Product Name	Model	Final Issue
Entrust AT	D153ATG	2019 2nd Edition (Issue 81)
Entrust AT	D154ATG	2019 2nd Edition (Issue 81)
Entrust DR	D153DRG	2019 2nd Edition (Issue 81)
Entrust DR	D154DRG	2019 2nd Edition (Issue 81)
Entrust Escudo	D144DRG	2019 2nd Edition (Issue 81)
Entrust Escudo	D144VRC	2019 2nd Edition (Issue 81)

Implantable Cardioverter Defibrillators (ICDs) continued

Product Name	Model	Final Issue
Entrust VR	D153VRC	2019 2nd Edition (Issue 81)
Entrust VR	D154VRC	2019 2nd Edition (Issue 81)
GEM	7227B	2011 1st Edition (Issue 64)
GEM	7227Cx	2011 1st Edition (Issue 64)
GEM	7227D	2011 1st Edition (Issue 64)
GEM	7227E	2011 1st Edition (Issue 64)
GEM DR	7271	2011 1st Edition (Issue 64)
GEM III DR	7275	2012 1st Edition (Issue 66)
GEM III VR	7231Cx	2016 1st Edition (Issue 74)
Intrinsic	7288	2016 1st Edition (Issue 74)
Marquis DR	7274	2016 1st Edition (Issue 74)
Marquis VR	7230B	2019 2nd Edition (Issue 81)
Marquis VR	7230Cx	2019 2nd Edition (Issue 81)
Marquis VR	7230E	2019 2nd Edition (Issue 81)
Maximo DR	7278	2017 1st Edition (Issue 76)
Maximo VR	7232B	2019 2nd Edition (Issue 81)
Maximo VR	7232Cx	2023 2nd Edition (Issue 89)
Maximo VR	7232E	2019 2nd Edition (Issue 81)
Onyx	7290Cx	2013 1st Edition (Issue 68)
Protecta DR	D334DRG	2023 2nd Edition (Issue 89)
Protecta DR	D334DRM	2023 2nd Edition (Issue 89)
Protecta VR	D334VRG	2023 2nd Edition (Issue 89)
Protecta VR	D334VRM	2023 2nd Edition (Issue 89)
Secura DR	D204DRM	2023 2nd Edition (Issue 89)
Secura DR	D214DRM	2023 2nd Edition (Issue 89)
Secura DR	D234DRG	2023 2nd Edition (Issue 89)
Secura VR	D204VRM	2023 2nd Edition (Issue 89)
Secura VR	D224VRC	2023 2nd Edition (Issue 89)
Virtuoso DR	D154AWG	2019 2nd Edition (Issue 81)
Virtuoso DR	D164AWG	2023 2nd Edition (Issue 89)
Virtuoso II DR	D274DRG	2023 2nd Edition (Issue 89)
Virtuoso II DR	D294DRG	2023 2nd Edition (Issue 89)
Virtuoso II VR	D274VRC	2023 2nd Edition (Issue 89)
Virtuoso VR	D154VWC	2019 2nd Edition (Issue 81)
Virtuoso VR	D164VWC	2023 2nd Edition (Issue 89)

Implantable Pulse Generators (IPGs)

Product Name	Model	Final Issue
Advisa DR	A4DR01	2019 1st Edition (Issue 80)
AT500	AT501	2013 1st Edition (Issue 68)
EnPulse	E2D01	2017 2nd Edition (Issue 77)

Product Name	Model	Final Issue
EnPulse	E2D03	2017 2nd Edition (Issue 77)
EnPulse DR	E1DR01	2017 2nd Edition (Issue 77)
EnPulse DR	E1DR03	2017 2nd Edition (Issue 77)
EnPulse DR	E1DR06	2017 2nd Edition (Issue 77)
EnPulse DR	E1DR21	2017 2nd Edition (Issue 77)
EnPulse DR	E2DR01	2017 2nd Edition (Issue 77)
EnPulse DR	E2DR03	2017 2nd Edition (Issue 77)
EnPulse DR	E2DR06	2017 2nd Edition (Issue 77)
EnPulse DR	E2DR21	2017 2nd Edition (Issue 77)
EnPulse DR	E2DR31	2017 2nd Edition (Issue 77)
EnPulse DR	E2DR33	2017 2nd Edition (Issue 77)
EnPulse SR	E2SR01	2017 2nd Edition (Issue 77)
EnPulse SR	E2SR03	2017 2nd Edition (Issue 77)
EnPulse SR	E2SR06	2017 2nd Edition (Issue 77)
EnPulse VDD	E2VDD01	2017 2nd Edition (Issue 77)
EnRhythm DR	P1501DR	2023 2nd Edition (Issue 89)
EnRhythm MRI	EMDR01	2017 1st Edition (Issue 76)
Kappa 400 DR	KDR401	2017 1st Edition (Issue 76)
Kappa 400 DR	KDR403	2017 1st Edition (Issue 76)
Kappa 400 SR	KSR401	2017 1st Edition (Issue 76)
Kappa 400 SR	KSR403	2017 1st Edition (Issue 76)
Kappa 600 DR	KDR601	2012 1st Edition (Issue 66)
Kappa 600 DR	KDR603	2012 1st Edition (Issue 66)
Kappa 600 DR	KDR606	2012 1st Edition (Issue 66)
Kappa 600 DR	KDR651	2012 1st Edition (Issue 66)
Kappa 600 DR	KDR653	2012 1st Edition (Issue 66)
Kappa 700 DR	KD700	2017 1st Edition (Issue 76)
Kappa 700 DR	KD701	2017 1st Edition (Issue 76)
Kappa 700 DR	KD703	2017 1st Edition (Issue 76)
Kappa 700 DR	KD706	2017 1st Edition (Issue 76)
Kappa 700 DR	KDR700	2017 1st Edition (Issue 76)
Kappa 700 DR	KDR701	2017 1st Edition (Issue 76)
Kappa 700 DR	KDR703	2017 1st Edition (Issue 76)
Kappa 700 DR	KDR706	2017 1st Edition (Issue 76)
Kappa 700 DR	KDR721	2017 1st Edition (Issue 76)
Kappa 700 SR	KSR700	2016 2nd Edition (Issue 75)
Kappa 700 SR	KSR701	2017 1st Edition (Issue 76)
Kappa 700 SR	KSR703	2017 1st Edition (Issue 76)
Kappa 700 SR	KSR706	2017 1st Edition (Issue 76)
Kappa 700 VDD	KVDD701	2012 2nd Edition (Issue 67)
Kappa 800 DR	KDR801	2013 1st Edition (Issue 68)
Kappa 800 DR	KDR803	2013 1st Edition (Issue 68)

Product Name	Model	Final Issue
Kappa 900 D	KD901	2017 1st Edition (Issue 76)
Kappa 900 D	KD903	2017 1st Edition (Issue 76)
Kappa 900 D	KD906	2017 1st Edition (Issue 76)
Kappa 900 DR	KDR901	2017 1st Edition (Issue 76)
Kappa 900 DR	KDR903	2017 1st Edition (Issue 76)
Kappa 900 DR	KDR906	2017 1st Edition (Issue 76)
Kappa 900 DR	KDR921	2017 1st Edition (Issue 76)
Kappa 900 SR	KSR901	2017 1st Edition (Issue 76)
Kappa 900 SR	KSR903	2017 1st Edition (Issue 76)
Kappa 900 SR	KSR906	2017 1st Edition (Issue 76)
Kappa 900 VDD	KVDD901	2017 1st Edition (Issue 76)
Legend II	8424	2012 1st Edition (Issue 66)
Legend II	8426	2012 1st Edition (Issue 66)
Legend II	8427	2012 1st Edition (Issue 66)
Minix	8340	2012 1st Edition (Issue 66)
Minix	8341	2012 1st Edition (Issue 66)
Minix	8341M	2012 1st Edition (Issue 66)
Minix	8342	2012 1st Edition (Issue 66)
Minix ST	8330	2012 1st Edition (Issue 66)
Minix ST	8331	2012 1st Edition (Issue 66)
Minix ST	8331M	2012 1st Edition (Issue 66)
Minuet	7107	2012 1st Edition (Issue 66)
Minuet	7108	2012 1st Edition (Issue 66)
Preva DR	7088	2012 1st Edition (Issue 66)
Preva DR	7089	2012 1st Edition (Issue 66)
Preva SR	8088	2012 1st Edition (Issue 66)
Preva SR	8089	2012 1st Edition (Issue 66)
Prevail S	8085	2012 1st Edition (Issue 66)
Prevail S	8086	2012 1st Edition (Issue 66)
Prodigy DR	7860	2012 1st Edition (Issue 66)
Prodigy DR	7861	2012 1st Edition (Issue 66)
Prodigy DR	7862	2012 1st Edition (Issue 66)
Prodigy SR	8158	2013 1st Edition (Issue 68)
Prodigy SR	8160	2013 1st Edition (Issue 68)
Prodigy SR	8161	2013 1st Edition (Issue 68)
Prodigy SR	8162	2013 1st Edition (Issue 68)
Sigma 100 S	SS103	2017 2nd Edition (Issue 77)
Sigma 100 S	SS106	2017 2nd Edition (Issue 77)
Sigma 200 D	SD203	2017 2nd Edition (Issue 77)
Sigma 200 DR	SDR203	2017 2nd Edition (Issue 77)
Sigma 200 S	SS203	2017 2nd Edition (Issue 77)
Sigma 200 SR	SSR203	2017 2nd Edition (Issue 77)

Implantable Pulse Generators (IPGs) continued

Product Name	Model	Final Issue
Sigma 300 D	SD303	2023 2nd Edition (Issue 89)
Sigma 300 DR	SDR303	2023 2nd Edition (Issue 89)
Sigma 300 DR	SDR306	2019 2nd Edition (Issue 81)
Sigma 300 S	SS303	2023 2nd Edition (Issue 89)
Sigma 300 SR	SSR303	2023 2nd Edition (Issue 89)
Sigma 300 SR	SSR306	2019 2nd Edition (Issue 81)
Sigma 300 VDD	SVDD303	2019 2nd Edition (Issue 81)
Thera-i DR	7960i	2012 1st Edition (Issue 66)
Thera-i DR	7961i	2012 1st Edition (Issue 66)
Thera-i DR	7962i	2012 1st Edition (Issue 66)
Thera-i SR	8960i	2012 1st Edition (Issue 66)
Thera-i SR	8961i	2012 1st Edition (Issue 66)
Thera-i SR	8962i	2012 1st Edition (Issue 66)
Thera-i VDD	8968i	2012 1st Edition (Issue 66)

LEADS

Pacing Leads

Product Name	Model	Final Issue
CapSure Sense	4073	2023 2nd Edition (Issue 89)
CapSure SP	4023	2012 2nd Edition (Issue 67)
CapSure SP	4024	2016 1st Edition (Issue 74)
CapSure SP	4523	2012 2nd Edition (Issue 67)
CapSure SP	4524	2016 1st Edition (Issue 74)
CapSure SP	5023	2012 2nd Edition (Issue 67)
CapSure SP	5023M	2012 2nd Edition (Issue 67)
CapSure SP	5024	2013 1st Edition (Issue 68)
CapSure SP	5024M	2013 1st Edition (Issue 68)
CapSure SP	5524	2013 1st Edition (Issue 68)
CapSure SP	5524M	2013 1st Edition (Issue 68)
CapSure Z	4033	2012 2nd Edition (Issue 67)
CapSure Z	4533	2012 2nd Edition (Issue 67)
CapSure Z	5033	2016 1st Edition (Issue 74)
CapSure Z	5034	2016 1st Edition (Issue 74)
CapSure Z	5534	2016 1st Edition (Issue 74)
CapSureFix	4067	2012 2nd Edition (Issue 67)
CapSureFix	4068	2016 1st Edition (Issue 74)
CapSureFix	4568	2017 2nd Edition (Issue 77)
CapSureFix	5068	2017 1st Edition (Issue 76)
CapSureFix	5568	2016 1st Edition (Issue 74)

Pacing Leads continued

Product Name	Model	Final Issue
CapSureFix	6940	2018 1st Edition (Issue 78)
Screw-In	4558M	2016 1st Edition (Issue 74)
SureFix	5072	2018 1st Edition (Issue 78)

Defibrillation Leads

Product Name	Model	Final Issue
Epicardial Patch	6921	2013 1st Edition (Issue 68)
Sprint	6932	2016 1st Edition (Issue 74)
Sprint	6942	2017 1st Edition (Issue 76)
Sprint	6943	2017 2nd Edition (Issue 77)
Sprint	6945	2017 2nd Edition (Issue 77)
Sub-Q	6999	2012 1st Edition (Issue 66)
Sub-Q Patch	6939	2012 1st Edition (Issue 66)
SVC/CS	6963	2013 1st Edition (Issue 68)
Transvene	6936	2013 1st Edition (Issue 68)
Transvene	6966	2013 1st Edition (Issue 68)
Transvene SVC	6937	2016 1st Edition (Issue 74)
Transvene SVC-CS	6933	2016 1st Edition (Issue 74)

Left Heart Pacing Leads

Product Name	Model	Final Issue
Attain CS	2188	2012 2nd Edition (Issue 67)

Epicardial/Myocardial Pacing Leads

Product Name	Model	Final Issue
Spectraflex	4951	2013 1st Edition (Issue 68)
Spectraflex	4951M	2013 1st Edition (Issue 68)

VDD Single Pass Pacing Leads

Product Name	Model	Final Issue
CapSure VDD	5032	2016 1st Edition (Issue 74)

Mailer Kits Available for Returning Product

Medtronic urges all physicians to return explanted products and to notify Medtronic when a product is no longer in use, regardless of reason for explant or removal from use. The procedures for returning products vary by geographic location.

Mailer kits with prepaid US postage are available for use within the United States to send CRT, ICD, IPG, and leads to Medtronic's CRM Returned Product Analysis Lab. These mailers are sized to accommodate the devices and leads from a single patient or clinical event and are designed to meet US postal regulations for mailing biohazard materials.

If the product being returned is located outside the United States, please contact your local Medtronic representative for instructions.

Medtronic also requests the return of devices from non-clinical sources, such as funeral homes, and will assume responsibility for storage and disposal of the product once received.

Mailer kits can be obtained by contacting the Returned Product Lab.

CRM Returned Product Analysis Laboratory
Phone: 1 (800) 328-2518, ext. 44800
Email: crdm.returnedproduct@medtronic.com

For questions related to returning explanted product from outside the United States, please contact your local Medtronic Representative.

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(24-hour technical support for physicians and medical professionals)

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