FDA Executive Summary

Prepared for the
FDA Pediatric Advisory Committee
Fall 2026 Review Cycle

H990014
Enterra® Therapy System

Table of Contents

INTRODUCTION

In accordance with the Pediatric Medical Device Safety and Improvement Act, this document provides the Pediatric Advisory Committee (PAC) with post-marketing safety information to support the annual review of the Enterra® Therapy System ("Enterra"). The purpose of this annual review is: (1) ensure that the Humanitarian Device Exemption (HDE) for this device remains appropriate for the pediatric population for which it was granted, and (2) provide the PAC an opportunity to advise FDA on any new safety concerns related to use of this device in pediatric patients.

This document summarizes the safety data FDA reviewed in the year following our 2025 report to the PAC. The document includes data from the manufacturer's annual report, post-market medical device reports (MDR) of adverse events and a literature review.

DEVICE DESCRIPTION

The Enterra Therapy System is a surgically implanted electrical Stimulator (GES). The mechanism(s) by which Enterra works is not well understood but may involve indirect neuromodulation of parasympathetic nerves and/or ganglia, which regulate gastric function. The Enterra Therapy System consists of the following components:

1. A neurostimulator placed in a subcutaneous pocket in the abdomen, which functions like a pacemaker delivering electrical pulses to the stimulation leads. The neurostimulator contains a sealed battery and electronic circuitry.
2. Two intramuscular leads connect to the neurostimulator, and are implanted into the muscularis propria on the greater curvature at the limit of the corpus-antrum. The leads deliver electrical pulses to the stomach muscle.
3. An external clinician programmer.

Schematic diagrams of the implantable components and device placement are provided in Figures 1 and 2, respectively.

Figure 1: Implantable components

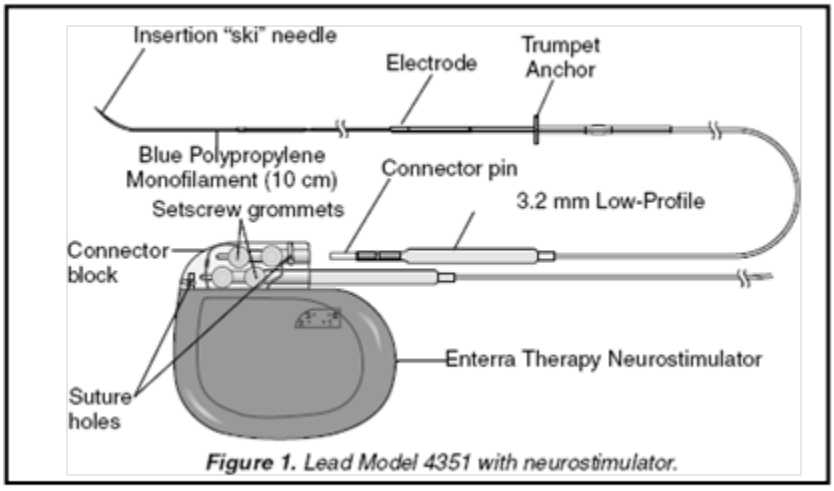
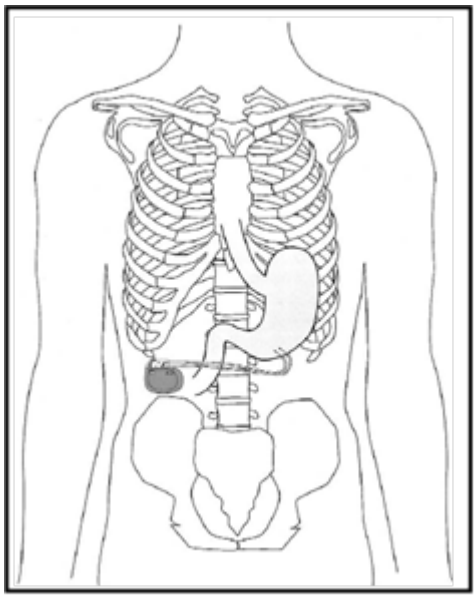


Figure 2: Device placement



INDICATIONS FOR USE

Enterra Therapy System for Gastric Electrical Stimulation (GES) is indicated for the treatment of chronic, intractable (drug-refractory) nausea and vomiting secondary to gastroparesis of diabetic or idiopathic etiology in patients aged 18 to 70 years.

The Enterra Therapy System HDE is approved for patients 18 to 70 years old. This age range includes a subset

of the overall pediatric population (ages 18 to 21). This summary includes patients treated under the approved HDE indications for use, and patients treated under the practice of medicine (patients less than 18 years old).

REGULATORY HISTORY

September 23, 1999: Granting of Humanitarian Use Device (HUD) designation for Enterra (HUD#990014)
March 30, 2000: Approval of Enterra HDE (H990014)
March 25, 2013: Approval to profit on the sale of Enterra

DEVICE DISTRIBUTION DATA

Section 520(m)(6)(A)(ii) of the Food, Drug, and Cosmetic Act (FD&C Act) allows HDEs indicated for pediatric use to be sold for profit if the number of devices distributed in any calendar year does not exceed the annual distribution number (ADN). On December 13, 2016, the 21st Century Cures Act (Pub. L. No. 114-255) updated the definition of ADN to be the number of devices "reasonably needed to treat, diagnose, or cure a population of 8,000 individuals in the United States." Based on this definition, the approved ADN for Enterra is 8,000 per year. The total number of Enterra devices sold in the U.S. for the previous reporting periods as reported by Enterra and Medtronic are detailed in Table 1. The number of devices implanted in pediatric patients this reporting period are summarized in Table 2.

TABLE 1: Device Distribution Data

Model Number & Component Name	Devices Sold From 05/01/25 – 03/31/26	Devices Sold From 02/01/24 – 01/31/25	Devices Sold From 02/01/23 – 01/31/24	Devices Sold From 02/01/22 – 01/31/23	Devices Sold From 02/01/21 – 01/31/22	Devices Sold From 02/01/20 – 01/31/21	Devices Sold From 02/01/19 – 01/31/20	Devices Sold From 02/01/18 -01 /31/19	Devices Sold From 02/01/17 – 01/31/18
37800 Implantable Neurostimulator	2825	3099	2923	2410	2127	1895	2053	1951	2017
*3116 Implantable Neurostimulator	0	0	0	0	0	0	0	0	0
4351 Intramuscular Lead	2592	3269	3027	2345	2131	1874	1988	2106	2535
30101** Intramuscular Lead	384	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**3116 Implantable Neurostimulator was discontinued by Medtronic prior to transfer to Enterra Medical*
**Received FDA approval Jan 2026

TABLE 2: Number of devices implanted in pediatric patients*

Reporting Period: 5/1/25-3/31/26	Total N (newly implanted this period)	Female by age in years			Male by age in years			Gender Unknown by age in years		
		<2	2<18	≥18<22	<2	2<18	≥18<22	<2	2<18	≥18<22
Newly implanted pediatric patients during this reporting period										
Total pediatric patients with active implants this reporting period										

* *Annual report was not received in time to complete this table for the Executive Summary*

ANNUAL REPORT REVIEW

This year's annual report was not received in time to include in the 2026 Executive Summary, although the report was received on time in previous years. When FDA reached out to Enterra, the company did respond with the information needed for this summary. The annual report includes annual distribution information; summary of changes including design, manufacturing and labeling; reports of scientific investigations in the literature; clinical experience including medical device reports; and a pediatric safety report. FDA received annual distribution information from the manufacturer, and conducted the following independent MDR and literature review for this Executive Summary.

MEDICAL DEVICE REPORT REVIEW

Overview of MDR database

The MDR database is one of several important post-market surveillance data sources used by FDA. Each year, FDA receives several hundred thousand medical device reports of suspected device-associated deaths, serious injuries, and malfunctions. The MDR database includes MDRs submitted to the FDA by mandatory reporters (manufacturers, importers and device user facilities) and voluntary reporters such as health care professionals, patients, and consumers. FDA uses MDRs to monitor device performance, detect potential device-related safety issues, and as part of benefit-risk evaluation of devices. MDR reports can be used effectively for the following:

- Establish a qualitative snapshot of adverse events for a specific device or devicetype
- Detect actual or potential device problems in a "real world" setting/environment, including:
    - rare, serious, or unexpected adverse events
    - adverse events that occur during long-term deviceuse
    - adverse events associated with vulnerable populations
    - off-label use
    - use error

Although MDRs are a valuable source of information, this passive surveillance system has limitations, including the potential submission of incomplete, inaccurate, untimely, unverified, or biased data. In addition, the incidence or prevalence of an event cannot be determined from this reporting system alone due to potential under-reporting of events and lack of information about frequency of device use. Because of this, MDRs comprise only one of the FDA's post-market surveillance data sources. Other limitations of MDRs include:

- MDR data alone cannot be used to establish rates of events, evaluate a change in event rate over time, or compare event rates between devices. The number of reports cannot be interpreted or used in isolation to reach conclusions about the existence, severity, or frequency of problems associated with devices.

- Confirming whether a device caused a specific event can be difficult based solely on information provided in a report. Establishing a cause-and-effect relationship is especially difficult if circumstances surrounding the event have not been verified or if the device in question has not been directly evaluated.

- MDR data is subject to reporting bias attributable to potential causes such as reporting practice, increased media attention, and/or other agency regulatory actions.

- MDR data does not represent all known safety information for a reported medical device and should be interpreted in the context of other available information when making device-related or treatment

decisions.

MDRs for the Enterra Therapy System

At the time of this year's Executive Summary, Medtronic is no longer responsible for MDR activities related to the Enterra Therapy System. MDR activities are the responsibility of Enterra Medical, Inc.

A single MDR may involve no product, an implanted neurostimulator, one or two leads, or a combination of leads and implanted neurostimulator. The Enterra Therapy System labeling includes a summary of known adverse events. The Enterra labeling identifies the following adverse events that were reported as MDRs in the current reporting year: impedance out of range, change in stimulation (described as a shocking, jolting, or tingling sensation), loss of therapeutic effect, neurostimulator system ceases to function due to battery depletion or telemetry issues, lead or neurostimulator erosion or migration, infections, stomach wall perforation, upper gastro-intestinal (GI) symptoms including nausea, vomiting, abdominal pain, discomfort, persistent pain at the neurostimulator site.

MDR Search Methodology

The MDR database was searched using the following search criteria:

- Product Code: LNQ
- Manufacturer name: Enterra
- Report Entered: between May 1, 2025, through March 31, 2026

The MDR search yielded 182 reports received between May 1, 2025, through March 31, 2026. The MDRs included 11 deaths, 156 injuries and 15 malfunction reports. Of the 182 reports there were 4 pediatric (18-21.9-year-old) patient reports.

Event Type by Patient Age

Table 3 summarizes the distribution of the MDRs by reported event type and age group. Four reports identified a pediatric patient from <18 to 21 years old at the time of the event. One report identified pediatric patients aged < 18 years old. Three reports identified pediatric patients 18-21.9 years old. All four pediatric reports were injury events. There were no pediatric reports of malfunctions or deaths this reporting period; however, MDR limitations include submission of incomplete reports including indeterminate age information.

TABLE 3: Overall event type distribution by patient age

Event Type	Total MDR Count 5/1/2025– 3/31/2026	MDR Count by Patient Age (years)			
		Pediatric (< 18)	Pediatric (18-21.9)	Adult (≥ 22)	Indeterminate (Age blank)
Death	11	0	0	4	7
Injury	156	1	3	104	48
Malfunction	15	0	0	6	9
Total MDR Count	182	1	3	114	64

Historical Event Type Information

Table 4 summarizes the current event type distribution and prior years. In 10 of 11 death reports this reporting period, the product was returned for analysis. As reported in the Medtronic database, the reports did not include sufficient information to evaluate device relatedness. One of the 11 death reports identified the cause of death as complications related to tachycardia and not device related.

TABLE 4: Overall event type distribution by reporting year

	Total MDR Count								
Event Type	2018 PAC Meeting 5/2017-4/2018	2019 PAC Meeting 5/2018 – 4/2019	2020 PAC Meeting 5/2019 – 4/2020	2021 PAC Meeting 5/2020 – 4/2021	2022 PAC Meeting 5/2021-4/2022	2023 PAC Meeting 5/2022-4/2023	2024 PAC Meeting 5/2023-4/2024	2025 PAC Meeting 5/2024-4/2025	2026 PAC Meeting 5/2025-3/2026
Death*	0	1	0	0	0	0	1	8**	11
Injury	285	184	117	127	116	172	37	113	156
Malfunction	150	120	61	57	57	56	70	36	15

* No deaths have been reported for pediatric patients.
**There were 6 deaths and device explants occurring outside of the reporting period but were reported during this reporting period that were non-device related. None occurred in pediatric patients

Patient Gender and Age Information

In the 182 MDRs received from May 1, 2025, through March 31, 2026, 118 MDRs contained patient age information. 113 patients were identified as adult (≥22 years old), 64 MDRs did not provide a patient age (indeterminate age reports) and 34 MDRs did not provide any gender information. Four MDRs were identified as pediatric patients in ages that ranged from 16-21.9 years old. All pediatric MDRs were identified as female. The majority of MDRs were from 131 female patients, with only 16 MDRs from male patients. The average patient age was 48.2. Review of the 64 unknown gender MDR report narrative sections to identify gender identifiers (male or female, she or her, he or him, etc.) did not result in identifying any additional female or male events. These reports identified the individual involved in the event only as "the patient".

Time to Event Occurrence

Table 5 summarizes an analysis of Time to Event Occurrence (TTEO). The TTEO is based on the implant duration and was calculated as the time between the date of implant and the date of event. For those reports without a date of event, the TTEO was calculated using the reported date of implant removal. These values were provided correctly for 71 events. There were 2 events which occurred intraoperatively or on the same day as implantation (TTEO=0). Time to Event could not be calculated for 111 events, including 1 pediatric report. One or both of the dates implanted and event date fields were missing or were incorrectly entered. A TTEO could not be determined for reports that did not include an explant date or event date. Table 5 summarizes the TTEO MDR count for the pediatric, adult, and indeterminate age patient populations. The pediatric MDR narratives included a pediatric injury reported in ≤ 30 days that identified shock and pain with resolution pending completion of investigation. A second pediatric injury report in ≤ 30 days identified an infection with device explantation. A third pediatric injury report in > 1 year – ≤ 5 years identified a revision due to battery failure.

TABLE 5: MDR count for the TTEO by patient age

Time to Event Occurrence (TTEO)	MDR Count by Patient Age (years)			
	Pediatric (<18)	Pediatric (18-21)	Adult (≥22)	Indeterminate (Age blank)
≤ 30 days	0	2	6	1
31 days - ≤ 1 year	0	0	16	4

> 1 year – ≤ 5 years	0	1	19	10
> 5 years	0	0	12	0
Totals (N=71)	0	3	53	15

Most Commonly Reported Patient Problem Codes (PPC)

Table 6 summarizes the most prevalent reported problem codes found in the MDRs reviewed during this reporting period classified by patient age. The top reported patient problems this reporting period are "Failure of Implant" (n=54), a decrease from last years (n=74). The second highest category "Electric Shock, Shock from Patient Lead(s)" (n=41), is characterized by inappropriate stimulation/shocking/burning and is similar to last year (n=42). The third most prevalent code "No Clinical Signs, Symptoms or Conditions, Symptoms, Conditions Term/Code Not Available/Insufficient Information" (n=33), is characterized by no findings and/or problem being detected after an investigation. This year's patient problem codes indicate patients continue to report device problems and gastrointestinal symptoms; however, these results do not present new or increased safety concerns when compared to the Enterra adverse event profile listed in the labeling and to last year's results.

TABLE 6: Most reported patient problem codes in MDRs received by patient age*

Patient Problem	Total Patient Problem Code	Total Patient Problem Code by Patient Age (years)			
		Pediatric (< 18)	Pediatric (18 to 21)	Adults (≥ 22)	Indeterminate (Age blank)
Failure of Implant	54	0	1	35	18
Electric Shock, Shock from Patient Lead(s), Abdominal Cramps	41	0	1	23	17
No Clinical Signs, Symptoms or Conditions/ Insufficient Information	33	0	0	32	1
Nausea, Vomiting, Diarrhea, Melena	27	0	0	22	5
Implant Pain, Pain, Abdominal Pain	26	0	0	22	4
Unspecified Infection, Medical device site infection, Granuloma	18	1	1	16	0
Unspecified Gastrointestinal Problem	13	0	0	13	0

Twiddlers Syndrome	2	0	0	2	0
Obstruction/Occlusion	2	0	0	2	0
Erosion, Pocket Erosion	2	0	0	2	0
Internal Organ Perforation	1	0	0	0	1
Total Count	219	1	3	169	46

* The total patient problem code (PPC) does not equal the total MDR count since one MDR might have multiple patient problems. Patient problem codes indicate the effects that an event may have had on the patient, including signs, symptoms, syndromes or diagnosis.

TABLE 7: Most Reported Device Problem Codes (DPC)

Table 7 provides the most prevalent reported device problems for all MDRs classified by patient age. The top three reported device problem codes this year are first, "Insufficient Information" (n=95), second "Adverse Event Without Identified Device or Use Problem" (n=56), and third "Battery Problem, High impedance, Impedance Problem, Low impedance, Output Problem, Failure to Deliver Energy" (n=22). Reports identified as Insufficient Information relate to the data needed to understand a malfunction, defect, or patient harm is incomplete, missing, or inadequate. Reports identified as "adverse event without identified device or use problem" are related to a patient experiencing serious harm or death associated with a device, but the investigation found no malfunction or user error.

TABLE 7: Most reported device problem codes in MDRs received by patient age*

Device Problem	Total Device Problem Code	Total Device Problem Code by Patient Age (years)			
		Pediatric (< 18)	Pediatric (18 to 21)	Adults (≥ 22)	Indeterminate (Age blank)
Insufficient Information	95	0	2	53	40
Adverse Event Without Identified Device or Use Problem	56	0	1	43	12
Battery Problem, High impedance, Impedance Problem, Low impedance, Output Problem, Failure to Deliver Energy	22	0	0	22	0
Unintended Electrical Shock, Inappropriate/Inadequate Shock/Stimulation, Premature Discharge of Battery	12	0	0	10	2
Malposition of Device, Migration, Device Dislodged or Dislocated, Expulsion	9	1	0	7	1

Lack of Effect, Therapeutic or Diagnostic Output Failure, Defective Device	7	0	0	6	1
No Apparent Adverse Event	6	0	0	0	6
Material Twisted/Bent, Break	4	0	0	3	1
Patient Device Interaction Problem	1	0	0	0	1
Loose or Intermittent Connection	1	0	0	1	0
Mis assembly by Users	1	0	0	0	1
Total Device Problem Code Count	214	1	3	145	65

* The total Device Problem Codes (DPC) does not equal the total MDR count since one MDR might have multiple patient problems. Device problem codes describe device failures or issues related to the device that are encountered during the event.

Pediatric Patient Problem as it relates to Device Problem Information

Table 9 summarizes the MDR occurrences of the top patient problems and issues in pediatric patients in comparison to the prior reporting periods. There were four pediatric MDRs this reporting period. Previous pediatric MDRs have included complaints of nausea, vomiting, pain, shock and infection, corresponding to device issue related to "Therapeutic Response, unexpected/decreased", and "inappropriate shock." These complaints and device problems were most often attributed to device setting, battery and lead issues. Adjustments of the device settings, follow up with the treating physician, hospitalization and request to explant the device have been noted interventions.

TABLE 9: Clinical events identified with pediatric patient historical comparison*

Clinical Events	Occurrences in MDRs** 5/1/2025-3/31/2026	Occurrences in MDRs** 5/1/2024-4/30/2025	Occurrences in MDRs** 5/1/2023-4/30/2024	Occurrences in MDRs** 5/1/2022-4/30/2023	Occurrences in MDRs** 5/1/2021-4/30/2022	Occurrences in MDRs** 5/1/2020-4/30/2021	Occurrences in MDRs** 5/1/2019–4/30/2000
Nausea/Vomiting	0	0	0	1	1	1	1
Unintended Revision Surgery	2	4	0	0	0	1	3

Pain/Discomfort/Abdominal pain/ Burning sensation	0	0	0	0	0	2	2
Electric Shock/Nerve Stimulation, Undesired/ [Inappropriate	1	1	3	1	0	0	1
Infection	1	2	1	0	0	0	1
Therapeutic Effects, Unexpected	0	0	0	0	0	1	0
Insufficient Information/Complaint Ill-Defined	0	0	0	0	1	1	0
Failure of Implant	1	0	0	0	0	0	0

**Only the most observed patient problems and issues in pediatric MDR narratives are included.*
***The total MDR Occurrences may not equal the total pediatric MDR count since one MDR might have multiple clinical events.*

Reinterventions in pediatric patients this reporting period

Reinterventions addressing clinical events are listed in Table 10. This table summarizes the reinterventions identified in the narratives and the causal events leading to these reinterventions. Reinterventions are events that require an additional procedure after the initial placement of the device.

TABLE 10: Reinterventions in pediatric patients*

Hazard	reinterventions	Causal Event	Outcome of reinterventions
Device Revision, Replacement, or Explantation	3	Patient with depleted battery; planning on revision surgery to replace.	Unknown if device was replaced, revision or explanted
Infection	1	Patient has infection; plan to remove the device.	Provider explanted device (date unknown) and disposed of it onsite therefore no analysis possible. No further action taken.

Shock	1	Patient reported pain at the surgical site	Inconsistent pain management, lowering of device settings, unknown if device was replaced, revision or explanted Seeking new provider for device management.
Migration	1	Patient developed granuloma and lead exposed	The doctor was able to move the leads and battery. Nothing was explanted.

**Note that the total counts may not equal the number of MDRs since one MDR might have multiple noted re-interventions.*

MDR Review Conclusions

The number of MDR reports received this reporting period with indeterminate age information is a weakness of this analysis. Both pediatric and adult patients experience similar device related problems including shock, battery issues and lead problems. The number and type of pediatric MDRs this year are similar to previous reporting periods. The MDR analysis indicates there may be reliability and/or safety issues that should continue to be monitored. FDA concludes the MDR results do not present new or increased safety concerns related to device use in pediatric patients.

LITERATURE REVIEW

Purpose

A systematic literature review was conducted to evaluate the safety and probable benefit of the Enterra Therapy System in the pediatric population (<22 years old). This review is an update to the literature reviews presented at the Pediatric Advisory Committee (PAC) meetings from 2014 through 2025. Specifically, the literature review was conducted to address the following questions:

1. What is the probable benefit of Enterra for the following clinical endpoints: improvement in upper GI symptoms; reduction in need for nutritional support; and improved gastric emptying time
2. What adverse events are reported in the literature after treatment with Enterra?

Methods

A literature search was conducted on April 15, 2026, using PubMed and Embase. The results were filtered for studies published in English. The search yielded a total of 21 citations (18 in PubMed and 3 in Embase). After a review of titles and abstracts, zero articles were selected for full review. The following search terms were used in PubMed and Embase searches:

- May 1, 2025, through March 31, 2026
- “Enterra” or “Enterra Therapy System” or “Enterra Medical” or “Medtronic”
- “Gastric electrical stimulation” or “gastric pacing” or “stomach paresis” or “stomach pacemaker” or “gastric pacemaker” or "gastric pacing" or “gastrointestinal neuromodulation” or “chronic intractable drug refractory nausea” or “chronic intractable drug refractory nausea” or “refractory vomiting” or “diabetic gastroparesis” or “idiopathic gastroparesis” or “gastroparesis” or “stomach or intestine or gastrointestinal neuromodulation”
- “Infant” or “pediatric” or “child” or “adolescent”
- English [Language]

Literature Review Conclusion

Similar to the previous literature reviews presented to the PAC from 2014 through 2025, the identification of relevant articles was determined by citations that included information relevant to the safety and probable benefit of the Enterra Therapy System and use in the pediatric population. Zero articles were identified that fit the search selection criteria. The literature review did not identify any information that changes the current safety and probable benefit profile of the Enterra Therapy System used in the pediatric population.

OVERALL SUMMARY

FDA did not identify any new safety signals during this year's review of MDRs or literature review since the last report to the PAC. FDA concludes the HDE for the Enterra® Therapy System remains appropriate for the pediatric population for which it was granted. FDA will continue routine surveillance including MDR and literature review. FDA will report the following to the PAC in 2027:

- Annual distribution number
- Literature review
- MDR review

REFERENCES

None