March 13, 2020

Endologix, Inc.
Mr. Larry Carrier
Senior Director, Regulatory Affairs
3910 Brickway Blvd.
Santa Rosa, California 95403

Re: P120006/S031
Trade/Device Name: Alto™ Abdominal Stent Graft System
Product Code: MIH
Filed: March 13, 2019
Amended: December 6, 2019, December 16, 2019

Dear Mr. Larry Carrier:

The Center for Devices and Radiological Health (CDRH) of the Food and Drug Administration (FDA) has completed its review of your premarket approval application (PMA) supplement for the Alto™ Abdominal Stent Graft System. This device is indicated for treatment of patients with infrarenal abdominal aortic aneurysms having the vascular morphology suitable for endovascular repair with the device, which includes the following:

- Adequate iliac/femoral access compatible with vascular access techniques (femoral cutdown or percutaneous), devices, and/or accessories.
- A proximal aortic landing zone for the sealing ring 7 mm below the inferior renal.
- An aortic sealing zone comprised of healthy aorta defined as:
    - lack of significant thrombus > 8 mm in thickness at any point along the aortic circumference at the level of 7 mm below the inferior renal artery;
    - lack of significant calcification at the level of 7 mm below the inferior renal artery;
    - conicity < 10% as measured from the inferior renal artery to the aorta 7 mm below the inferior renal artery;
    - an inner wall diameter of no less than 16 mm and no greater than 30 mm at 7 mm below the inferior renal artery; and,
    - an aortic angle of ≤ 60 degrees.
- A distal iliac landing zone:
    - with a length of at least 10 mm, and
    - with an inner wall diameter of no less than 8 mm and no greater than 25 mm.

We are pleased to inform you that the PMA supplement is approved. You may begin commercial distribution of the device in accordance with the conditions of approval described below. Although this letter refers to your product as a device, please be aware that some approved products may instead be combination products. The Premarket Approval Database located at

https://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfPMA/pma.cfm identifies combination product submissions.

The sale and distribution of this device is restricted to prescription use in accordance with 21 CFR 801.109 and under section 515(d)(1)(B)(ii) of the Federal Food, Drug, and Cosmetic Act (the act). The device is further restricted under section 515(d)(1)(B)(ii) of the act insofar as the labeling must specify the specific training or experience practitioners need in order to use the device. FDA has determined that these restrictions on sale and distribution are necessary to provide reasonable assurance of the safety and effectiveness of the device. Your device is therefore a restricted device subject to the requirements in sections 502(q) and (r) of the act, in addition to the many other FDA requirements governing the manufacture, distribution, and marketing of devices.

Expiration dating for this device has been established and approved at 3 years. This is to advise you that the protocol you used to establish this expiration dating is considered an approved protocol for the purpose of extending the expiration dating as provided by 21 CFR 814.39(a)(7).

Continued approval of the PMA is contingent upon the submission of periodic reports, required under 21 CFR 814.84, at intervals of one year (unless otherwise specified) from the date of approval of the original PMA. This report, identified as "Annual Report" and bearing the applicable PMA reference number, should be submitted to the address below. The Annual Report should indicate the beginning and ending date of the period covered by the report and should include the information required by 21 CFR 814.84.

In addition to the above, and in order to provide continued reasonable assurance of the safety and effectiveness of the PMA device, the Annual Report must include, separately for each model number (if applicable), the number of devices sold and distributed during the reporting period, including those distributed to distributors. The distribution data will serve as a denominator and provide necessary context for FDA to ascertain the frequency and prevalence of adverse events, as FDA evaluates the continued safety and effectiveness of the device.

You have agreed to provide a Clinical Update to physician users at least annually. At a minimum, this update will include the following regarding the Alto™ Abdominal Stent Graft System:

a. For your Case Selection and Sizing Study described below, a summary of the number of patients for whom data are available, with a summary of the agreement between treating physician and Endologix Imaging Services screening, as well as any adverse events reported.

b. For your Alto™ US and OUS Post-Approval Study described below, a summary of the number of patients for whom data are available, with the rates of major adverse events, aneurysm-related mortality, aneurysm rupture, secondary endovascular procedures, conversions to open surgical repair, endoleaks, aneurysm enlargement, prosthesis migration, occlusions, stenoses, losses of device integrity, and other procedure or device-related events. Reasons for secondary interventions and conversion to open surgery as well as causes of aneurysm-related death and rupture are to be described.

c. Relevant information from commercial experience of the Alto™ Abdominal Stent Graft System within and outside the United States.

d. A summary of any explant analysis findings regarding the Alto™ Abdominal Stent Graft System.

The Clinical Update for physician users and the information supporting the updates must be provided in the Annual Report.

In addition to the Annual Report requirements, you must provide the following data in post-approval study (PAS) reports for each PAS listed below. Separate PAS Progress Reports must be submitted for each study every six (6) months during the first two (2) years of the study and annually thereafter, unless otherwise specified by FDA. Each report, identified as a PMA Post-Approval Study Report" in accordance with how the study is identified below and bearing the applicable PMA reference number, should be submitted to the address below.

1. *Case Selection and Sizing Study:* This is a prospective, consecutively enrolling, single-arm, multi-center study. The study purpose is to ensure the patient population receiving the first commercial implants of the Alto™ device is consistent with the patient population enrolled in the ELEVATE pivotal study and to evaluate differences in the subject screening conducted by treating physicians and the Endologix Imaging Services. The study will prospectively enroll US subjects found to meet the anatomic criteria for Alto™ device implantation as specified in the approved labeling and assessed by treating physicians from a minimum of 15 US institutions who have successfully completed the Alto™ Training Program. Once consented by the institution, the treating physician will record the following per subject, at a minimum: 1) quantitative measurements of the subject's aortic morphology (e.g., aortic diameter, aneurysm neck length, aneurysm neck angulation); 2) commentary regarding the subject's general suitability for endovascular aneurysm repair (EVAR) using the Alto™ device; 3) a recommendation for implantation with the Alto™ device; and, 4) the Alto™ device and component(s) sizes appropriate for treatment, if applicable. The de-identified, diagnostic CT scans associated with each consented subject will then be sent to Endologix Imaging Services, who will independently assess each subjects' suitability for EVAR using the Alto™ device and record the same information as that recorded by the treating physician. At a minimum, the first 100 commercial subjects receiving an implantation recommendation from Endologix Imaging Services will be treated with the Alto™ device. Subjects will be consented until a minimum of 100 subjects have been treated with the Alto™ device. An independent, third-party will evaluate the differences between the data from the treating physicians and Endologix Imaging Services for all consented subjects; at a minimum, a Bland-Altmann method with a 95% confidence interval will be used to provide the expected limits of agreement for quantitative measures (e.g., aortic diameter), percent agreement in the format of a 2x2 contingency table will be used to provide the expected limits of agreement for qualitative measures (e.g., implantation recommendation), and the additional analyses of sensitivity, specificity, and positive and negative predictive values will be calculated for the recommendation for implantation using Endologix Imaging Serviceas the gold standard. All adverse events resulting in a product complaint occurring in consented subjects within 30 days of an Alto™ implantation procedure will be captured through the Endologix quality system and reported. No clinical follow-up imaging or evaluation(s) will be collected for consented subjects for the purposes of this study. Consented subjects will continue to receive the standard of care as directed by their treating physician outside of this study. Study reports will contain, at a minimum, all currently consented subject and adverse event data, as well as the aforementioned and corresponding analyses conducted by the independent, third party.

2. *Alto™ US and OUS Post Approval Study:* This is a prospective, multi-center, multi-national, post approval study. The objective of the study is to collect confirmatory safety and effectiveness data on the Alto™ Abdominal Stent Graft System for the endovascular treatment of infrarenal abdominal aortic aneurysms in routine clinical practice. Upon completion of the Alto™ Case Selection and Sizing study, this post approval study will begin prospectively enrolling subjects according to clinical guidelines and the treating physician's judgement. Notably, treating physicians will be making the determination regarding whether a subject should be enrolled and treated; they may request input from the Endologix Imaging Services. A minimum of 300 subjects at up to 40 sites in the US and 20 sites from outside the US, with no more than one-third non-US subjects, will be enrolled. Follow-up will occur at 30 days, 6 months, 1 year, and annually thereafter to 5 years. The primary composite endpoint is freedom from aneurysm-related complications, including conversion to open surgery, Type I and III endoleaks, device migration (>10 mm), aneurysm sac enlargement (>5 mm), device- and procedure-related secondary interventions, occlusion, aneurysm rupture, and aneurysm-related death. Adjudication of the primary composite endpoint will be conducted by an external, independent core lab at annual intervals through 5 years. Additional endpoints will be collected and reported annually through 5 years, including but not limited to the following: individual components of the primary composite endpoint, technical success, major adverse events, secondary interventions, all types of endoleaks, stenoses, losses of device integrity, other procedure- or device-related events, and rate of aneurysm neck expansion, as adjudicated by an independent external core lab. Outcomes will be reported using descriptive statistics. Additionally, a subgroup analysis that stratifies outcomes by subjects with certain vascular morphology will be reported.

Be advised that failure to comply with any post-approval requirement, including the completion requirements of the post-approval studies outlined above, constitutes grounds for FDA withdrawal of approval of the PMA in accordance with 21 CFR 814.82(c).

Be advised that the failure to conduct any such study in compliance with the good clinical laboratory practices in 21 CFR part 58 (if a non-clinical study subject to part 58) or the institutional review board regulations in 21 CFR part 56 and the informed consent regulations in 21 CFR part 50 (if a clinical study involving human subjects) may be grounds for FDA withdrawal of approval of the PMA.

Be advised that protocol information, interim and final results will be published on the Post Approval Study Webpage https://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfPMA/pma_pas.cfm.

In addition, the results from any post approval study should be included in the labeling as these data become available. Any updated labeling must be submitted to FDA in the form of a PMA Supplement. For more information on post-approval studies, see the FDA guidance document entitled, "Procedures for Handling Post-Approval Studies Imposed by PMA Order" (https://www.fda.gov/media/71327/download).

Within 30 days of your receipt of this letter, you must submit PMA supplements that include complete protocols of your post-approval studies described above. Your PMA supplements should be clearly labeled as a PMA Post-Approval Study Protocol" as noted above and submitted to the address below. Please reference the PMA number above to facilitate processing. If there are multiple protocols being finalized after PMA approval, please submit each protocol as a separate PMA supplement.

This is a reminder that as of September 24, 2014, class III devices are subject to certain provisions of the final Unique Device Identification (UDI) rule. These provisions include the requirement to provide a UDI on

the device label and packages (21 CFR 801.20), format dates on the device label in accordance with 21 CFR 801.18, and submit data to the Global Unique Device Identification Database (GUDID) (21 CFR 830 Subpart E). Additionally, 21 CFR 814.84 (b)(4) requires PMA annual reports submitted after September 24, 2014, to identify each device identifier currently in use for the subject device, and the device identifiers for devices that have been discontinued since the previous periodic report. It is not necessary to identify any device identifier discontinued prior to December 23, 2013. Combination Products may also be subject to UDI requirements (see 21 CFR 801.30). For more information on these requirements, please see the UDI website, https://www.fda.gov/medical-devices/device-advice-comprehensive-regulatory-assistance/unique-device-identification-udi-system.

Before making any change affecting the safety or effectiveness of the PMA device, you must submit a PMA supplement or an alternate submission (30-day notice) in accordance with 21 CFR 814.39. All PMA supplements and alternate submissions (30-day notice) must comply with the applicable requirements in 21 CFR 814.39. For more information, please refer to the FDA guidance document entitled, "Modifications to Devices Subject to Premarket Approval (PMA) - The PMA Supplement Decision-Making Process" https://www.fda.gov/media/81431/download.

You are reminded that many FDA requirements govern the manufacture, distribution, and marketing of devices. For example, in accordance with the Medical Device Reporting (MDR) regulation, 21 CFR 803.50 and 21 CFR 803.52 for devices or postmarketing safety reporting (21 CFR 4, Subpart B) for combination products, you are required to report adverse events for this device. Manufacturers of medical devices, including in vitro diagnostic devices, are required to report to FDA no later than 30 calendar days after the day they receive or otherwise becomes aware of information, from any source, that reasonably suggests that one of their marketed devices:

1. May have caused or contributed to a death or serious injury; or

2. Has malfunctioned and such device or similar device marketed by the manufacturer would be likely to cause or contribute to a death or serious injury if the malfunction were to recur.

Additional information on MDR, including how, when, and where to report, is available at https://www.fda.gov/medical-devices/medical-device-safety/medical-device-reporting-mdr-how-report-medical-device-problems and on combination product postmarketing safety reporting is available at (see https://www.fda.gov/combination-products/guidance-regulatory-information/postmarketing-safety-reporting-combination-products).

In accordance with the recall requirements specified in 21 CFR 806.10 for devices or the postmarketing safety reporting requirements (21 CFR 4, Subpart B) for combination products, you are required to submit a written report to FDA of any correction or removal of this device initiated by you to: (1) reduce a risk to health posed by the device; or (2) remedy a violation of the act caused by the device which may present a risk to health, with certain exceptions specified in 21 CFR 806.10(a)(2). Additional information on recalls is available at https://www.fda.gov/safety/recalls-market-withdrawals-safety-alerts/industry-guidance-recalls.

CDRH does not evaluate information related to contract liability warranties. We remind you; however, that device labeling must be truthful and not misleading. CDRH will notify the public of its decision to approve

your PMA by making available, among other information, a summary of the safety and effectiveness data upon which the approval is based. The information can be found on the FDA CDRH Internet HomePage located at https://www.fda.gov/medical-devices/device-approvals-denials-and-clearances/pma-approvals. Written requests for this information can also be made to the Food and Drug Administration, Dockets Management Branch, (HFA-305), 5630 Fishers Lane, Rm. 1061, Rockville, MD 20852. The written request should include the PMA number or docket number. Within 30 days from the date that this information is placed on the Internet, any interested person may seek review of this decision by submitting a petition for review under section 515(g) of the act and requesting either a hearing or review by an independent advisory committee. FDA may, for good cause, extend this 30-day filing period.

Failure to comply with any post-approval requirement constitutes a ground for withdrawal of approval of a PMA. The introduction or delivery for introduction into interstate commerce of a device that is not in compliance with its conditions of approval is a violation of law.

You are reminded that, as soon as possible and before commercial distribution of your device, you must submit an amendment to this PMA submission with a copy of all final labeling. Final labeling that is identical to the labeling approved in draft form will not routinely be reviewed by FDA staff when accompanied by a cover letter stating that the final labeling is identical to the labeling approved in draft form. If the final labeling is not identical, any changes from the final draft labeling should be highlighted and explained in the amendment.

All required documents should be submitted, unless otherwise specified, to the address below and should reference the above PMA number to facilitate processing.

U.S. Food and Drug Administration
Center for Devices and Radiological Health
Document Control Center - WO66-G609
10903 New Hampshire Avenue
Silver Spring, MD 20993-0002

If you have any questions concerning this approval order, please contact Anna Schumacher, Ph.D. at 301-796-1035 or Anna.Schumacher@fda.hhs.gov.

Sincerely,

Nicole G. Ibrahim -S

Nicole Ibrahim, Ph.D.
Director
DHT2B: Division of Circulatory Support,
Structural and Vascular Devices
OHT2: Office of Cardiovascular Devices
Office of Product Evaluation and Quality
Center for Devices and Radiological Health