



Annalise-AI Pty Ltd.
% Haylee Bosshard
Regulatory Affairs Manager
Level P, 24 Campbell Street
Sydney, New South Wales 2000
AUSTRALIA

August 15, 2023

Re: K231094

Trade/Device Name: Annalise Enterprise CTB Triage-OH
Regulation Number: 21 CFR 892.2080
Regulation Name: Radiological computer aided triage and notification software
Regulatory Class: Class II
Product Code: QAS
Dated: July 19, 2023
Received: July 19, 2023

Dear Haylee Bosshard:

We have reviewed your Section 510(k) premarket notification of intent to market the device referenced above and have determined the device is substantially equivalent (for the indications for use stated in the enclosure) to legally marketed predicate devices marketed in interstate commerce prior to May 28, 1976, the enactment date of the Medical Device Amendments, or to devices that have been reclassified in accordance with the provisions of the Federal Food, Drug, and Cosmetic Act (Act) that do not require approval of a premarket approval application (PMA). You may, therefore, market the device, subject to the general controls provisions of the Act. Although this letter refers to your product as a device, please be aware that some cleared products may instead be combination products. The 510(k) Premarket Notification Database located at <https://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfpmn/pmn.cfm> identifies combination product submissions. The general controls provisions of the Act include requirements for annual registration, listing of devices, good manufacturing practice, labeling, and prohibitions against misbranding and adulteration. Please note: CDRH does not evaluate information related to contract liability warranties. We remind you, however, that device labeling must be truthful and not misleading.

If your device is classified (see above) into either class II (Special Controls) or class III (PMA), it may be subject to additional controls. Existing major regulations affecting your device can be found in the Code of Federal Regulations, Title 21, Parts 800 to 898. In addition, FDA may publish further announcements concerning your device in the Federal Register.

Please be advised that FDA's issuance of a substantial equivalence determination does not mean that FDA has made a determination that your device complies with other requirements of the Act or any Federal statutes and regulations administered by other Federal agencies. You must comply with all the Act's

requirements, including, but not limited to: registration and listing (21 CFR Part 807); labeling (21 CFR Part 801); medical device reporting (reporting of medical device-related adverse events) (21 CFR 803) for devices or postmarketing safety reporting (21 CFR 4, Subpart B) for combination products (see <https://www.fda.gov/combination-products/guidance-regulatory-information/postmarketing-safety-reporting-combination-products>); good manufacturing practice requirements as set forth in the quality systems (QS) regulation (21 CFR Part 820) for devices or current good manufacturing practices (21 CFR 4, Subpart A) for combination products; and, if applicable, the electronic product radiation control provisions (Sections 531-542 of the Act); 21 CFR 1000-1050.

Also, please note the regulation entitled, "Misbranding by reference to premarket notification" (21 CFR Part 807.97). For questions regarding the reporting of adverse events under the MDR regulation (21 CFR Part 803), please go to <https://www.fda.gov/medical-devices/medical-device-safety/medical-device-reporting-mdr-how-report-medical-device-problems>.

For comprehensive regulatory information about medical devices and radiation-emitting products, including information about labeling regulations, please see Device Advice (<https://www.fda.gov/medical-devices/device-advice-comprehensive-regulatory-assistance>) and CDRH Learn (<https://www.fda.gov/training-and-continuing-education/cdrh-learn>). Additionally, you may contact the Division of Industry and Consumer Education (DICE) to ask a question about a specific regulatory topic. See the DICE website (<https://www.fda.gov/medical-devices/device-advice-comprehensive-regulatory-assistance/contact-us-division-industry-and-consumer-education-dice>) for more information or contact DICE by email (DICE@fda.hhs.gov) or phone (1-800-638-2041 or 301-796-7100).

Sincerely,

A handwritten signature in black ink that reads "Jessica Lamb". The signature is written in a cursive style. Behind the signature, there is a large, light blue watermark of the letters "FDA".

Jessica Lamb, Ph.D.
Assistant Director
Imaging Software Team
DHT8B: Division of Radiological Imaging
Devices and Electronic Products
OHT8: Office of Radiological Health
Office of Product Evaluation and Quality
Center for Devices and Radiological Health

Enclosure

Indications for Use

510(k) Number (if known)

K231094

Device Name

Annalise Enterprise CTB Triage - OH

Indications for Use (Describe)

Intended context:

Annalise Enterprise is a device designed to be used in the medical care environment to aid in triage and prioritization of studies with features suggestive of the following finding:

- obstructive hydrocephalus

The device analyzes studies using an artificial intelligence algorithm to identify the finding. It makes study-level output available to an order and imaging management system for worklist prioritization or triage.

The device is not intended to direct attention to specific portions of an image and only provides notification for the suspected finding.

Its results are not intended:

- to be used on a standalone basis for clinical decision making
- to rule out a specific finding, or otherwise preclude clinical assessment of CTB studies

Intended modality:

Annalise Enterprise identifies the suspected finding in non-contrast brain CT studies.

Intended user:

The device is intended to be used by trained clinicians who, as part of their scope of practice, are qualified to interpret brain CT studies.

Intended patient population:

The intended population is patients who are 22 years or older.

Type of Use (Select one or both, as applicable)

Prescription Use (Part 21 CFR 801 Subpart D)

Over-The-Counter Use (21 CFR 801 Subpart C)

CONTINUE ON A SEPARATE PAGE IF NEEDED.

This section applies only to requirements of the Paperwork Reduction Act of 1995.

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510(k) Summary

K231094

I. SUBMITTER

Company Name	Annalise-AI Pty Ltd
Address	Level P, 24 Campbell Street Sydney, NSW 2000 Australia
Phone Number	+61 1800-958487
Contact Person	Haylee Bosshard
Date Prepared	July 7, 2023

II. SUBJECT DEVICE

Manufacturer Name	Annalise-AI Pty Ltd
Device Name	Annalise Enterprise CTB Triage – OH
Classification Name	Radiological computer aided triage and notification software (21CFR892.2080)
Regulatory Class	II
Product Code	QAS

III. PREDICATE DEVICE

Manufacturer Name	Aidoc Medical, Ltd.
Device Name	BriefCase
510(k) reference	K221314
Classification Name	Radiological computer aided triage and notification software (21CFR892.2080)
Regulatory Class	II
Product Code	QAS

This predicate has not been subject to a design-related recall. No reference devices were used in this submission.

IV. DEVICE DESCRIPTION

Annalise Enterprise CTB Triage – OH is a software workflow tool which uses an artificial intelligence (AI) algorithm to identify suspected findings on non-contrast brain CT studies in the medical care environment. The findings identified by the device include obstructive hydrocephalus.

Radiological findings are identified by the device using an AI algorithm – a convolutional neural network trained using deep-learning techniques. Images used to train the algorithm were sourced from datasets that included a range of equipment manufacturers including Toshiba, GE Medical Systems, Siemens, Philips, and Canon Medical Systems. This dataset, which contained over 200,000 CT brain imaging studies, was annotated by qualified and trained radiologists.

The performance of the device’s AI algorithm was validated in a standalone performance evaluation, in which the case-level output from the device was compared with a reference standard (‘ground truth’). This was determined by two ground truthers, with a third truther used in the event of disagreement. All truthers were US board-certified neuroradiologists.

The device interfaces with image and order management systems (such as PACS/RIS) to obtain non-contrast brain CT studies for processing by the AI algorithm. Following processing, if any of the radiological findings of interest are identified in a non-contrast brain CT study, the device provides a notification to the image and order management system for prioritization of that study in the worklist. This enables users to review the studies containing features suggestive of these radiological findings earlier than in the standard clinical workflow. It is important to note that the device will never decrease a study’s existing priority in the worklist. This ensures that worklist items will never have their priorities downgraded based on AI results.

The device workflow is performed parallel to and in conjunction with the standard clinical workflow for interpretation of non-contrast brain CTs. The device is intended to aid in prioritization and triage of radiological medical images only.

V. INDICATIONS FOR USE

The Indications for Use statement is as follows:

Intended context *Annalise Enterprise is a device designed to be used in the medical care environment to aid in triage and prioritization of studies with features suggestive of the following finding:*

- *obstructive hydrocephalus*

The device analyzes studies using an artificial intelligence algorithm to identify the finding. It makes study-level output available to an order and imaging management system for worklist prioritization or triage.

The device is not intended to direct attention to specific portions of an image and only provides notification for the suspected finding.

Its results are not intended:

- *to be used on a standalone basis for clinical decision making*
- *to rule out specific findings, or otherwise preclude clinical assessment of CTB studies*

Intended modality *Annalise Enterprise identifies suspected findings in non-contrast brain CT studies.*

Intended user *The device is intended to be used by trained clinicians who, as part of their scope of practice, are qualified to interpret brain CT studies.*

Intended patient population *The intended population is patients who are 22 years or older.*

The Indications for Use statement of the subject device differs to the predicate device only in the clinical conditions of interest, however a standalone performance evaluation was conducted and demonstrated that the device is as safe and effective for its intended use. Both the subject and predicate device are intended for use to assist with worklist triage by providing notifications of suspected findings and their associated priority.

VI. COMPARISON OF TECHNOLOGICAL CHARACTERISTICS WITH THE PREDICATE DEVICE

The subject device was evaluated and compared to the predicate device with respect to the following characteristics:

1. Indications for Use
2. Anatomical site and modality
3. Intended user and clinical use environment
4. Technical method for notification and prioritization
5. Set of findings and algorithm
6. Device input and radiological image protocol
7. Device output and means of notification to user
8. System components
9. Location where results are received
10. Prioritization relationship to standard of care workflow
11. Ability to support effective triage

The following characteristics showed a difference between the subject and predicate devices. The different characteristics include:

1. Set of findings and algorithm
2. Device output and means of notification to user

The first difference between the subject and predicate device is the set of findings that the subject device identifies and the underlying artificial intelligence algorithm. The performance of the subject device algorithm for each of the findings was addressed in a standalone performance evaluation and showed that the subject device is as safe and effective for its intended use as the predicate device.

The second difference between the subject and predicate device is the output and means of notification. While both devices provide preview images to be viewed on a non-medical viewer, the subject device injects back into a worklist whereas the predicate notification is directed to another desktop application. Furthermore, the subject adds a priority, whereas the predicate flags them for review. However, these differences do not raise new questions of safety and effectiveness.

VII. PERFORMANCE DATA

The following performance data have been provided to support evaluation of substantial equivalence.

A. Software Verification and Validation Testing

Software verification and validation testing was conducted, and documentation was provided as recommended by FDA's Guidance for Industry and FDA Staff, "Guidance for the Content of Premarket Submissions for Software Contained in Medical Devices", May 11, 2005.

B. Performance Testing

Performance of the subject device was assessed in a pivotal performance study to satisfy requirements set forth in the special controls per 21CFR892.2080. The performance study included standalone model performance and triage effectiveness evaluations.

Standalone performance was assessed via a retrospective, anonymized study of adult patient, DICOM-compliant non-contrast brain CT cases. The test dataset used during the standalone performance evaluation was newly acquired and independent from the training dataset used in model development. Independence was ensured through selection of test data from hospital network sites where none of the training data was sourced. The standalone performance study was conducted on an independent cohort which equated to a total dataset of 175 cases for slice thickness $\leq 1.5\text{mm}$ (positive $n=75$ and negative $n=100$) and 191 cases for slice thickness $> 1.5\text{mm}$ & $\leq 5.0\text{mm}$ (positive $n=84$ and negative $n=107$), collected consecutively from five US hospital network sites. These sites included both community hospitals and academic medical centers.

The performance testing dataset included representation across subgroups for patient demographics:

- slice thickness $\leq 1.5\text{mm}$: gender [Female: 56.0 %, Male: 44.0%], age [mean: 61.2 years], ethnicity [Hispanic: 9.7%], race [White/Caucasian: 76.6%, Other: 18.3%, Unknown: 5.1%], and
- slice thickness $> 1.5\text{mm}$ & $\leq 5.0\text{mm}$: gender [Female: 55.0%, Male: 45.0%], age [mean: 61.6 years], ethnicity [Hispanic: 8.9%], race [White/Caucasian: 77.0%, Other: 18.3%, Unknown: 4.7%].

It also included representation from important cohorts such as common co-existing findings and cases that may mimic the appearance of obstructive hydrocephalus (enlargement of ventricles due to alternate causes). The dataset included a majority of cases from GE Healthcare and Siemens CT scanners for the pivotal study. Additional analyses were conducted with GE, Philips, Siemens and Toshiba scanners to demonstrate the generalizability of the device.

To determine the ground truth, each deidentified case was annotated in a blinded fashion by at least two ABR-certified and protocol-trained neuroradiologists (ground truthers), with consensus determined by two ground truthers and a third ground truther in the event of disagreement. The key results of the study are summarized in the following table.

Finding	Slice Thickness Range	Operating Point	Sensitivity % (Se) (95% CI)	Specificity % (Sp) (95% CI)
Obstructive Hydrocephalus	≤1.5mm	0.149943	97.3 (93.3,100.0)	94.0 (89.0,98.0)
		0.185900	94.7 (89.3,98.7)	95.0 (90.0,99.0)
		0.281473	92.0 (85.3,97.3)	97.0 (93.0,100.0)
	>1.5mm & ≤5.0mm	0.100591	97.6 (94.0,100.0)	95.3 (90.7,99.1)
		0.149943	95.2 (90.5,98.8)	95.3 (90.7,99.1)
		0.185900	94.0 (89.3,98.8)	95.3 (90.7,99.1)
		0.281473	88.1 (81.0,94.0)	95.3 (90.7,99.1)

The results demonstrate the subject device establishes effective triage within a clinician’s queue based on high sensitivity and specificity. Further, these results are substantially equivalent to those of the predicate device.

Triage effectiveness (turn-around time) was assessed by an internal bench study using a dataset of n=277 cases positive for any of the findings eligible for prioritization. These cases were collected from multiple data sources spanning a variety of geographical locations, patient demographics and technical characteristics. The results demonstrated a triage turn-around time of 81.6 (95%CI: 80.3 – 82.9) seconds, which is substantially equivalent to the total performance time published for the predicate device.

Therefore, the subject device has been shown to satisfy the performance requirements per 21CFR892.2080, for ‘Radiological computer aided triage and notification software’, by providing clinically effective triage for non-contrast brain CT studies containing features suggestive of radiological findings of interest. This data demonstrates the subject device is safe and effective for its intended use, and thereby supports substantial equivalence.

VIII. CONCLUSIONS

The subject device and the predicate device are both software only packages, devices intended to assist with worklist triage by providing notification of findings. The subject and predicate devices utilize the same principles of operation and work in parallel to the current standard of care workflow.

Both the subject and predicate devices use an artificial intelligence algorithm to identify findings in images and require the same inputs (DICOM image data) and provide the same outputs (prioritization for a medical worklist).

The technological differences between the subject and predicate devices do not raise new questions of safety and effectiveness.

Standalone performance testing and the comparison of technological characteristics with the predicate device shows that the subject device:

- performs as intended,
- is safe and effective for its intended use, and
- is therefore substantially equivalent to the predicate device.