K133067

NOV 22 2013

510(k) Summary of Safety and Effectiveness
ADVIA® 1800 Chemistry Triglycerides_2 Reagents (TRIG_2)

This summary of 510(k) safety and effectiveness information is being submitted in accordance with the requirements of SMDA 1990 and 21 CFR 807.92.

2. **510(k) Number:** _____

2. **Applicant:**

Contact:	Kira Gordon, PhD
	Sr. Regulatory Affairs Specialist
Address:	Siemens Healthcare Diagnostics, Inc
	511 Benedict Ave,
	Tarrytown, NY 10591
Phone:	(914) 524-2996
	(914) 524-3579 (FAX)

3. **Date:** September 26, 2013

4. **Proprietary and Established Names:**
ADVIA® Chemistry Triglycerides_2 Assay (TRIG_2)

5. **Regulatory Information:**
Regulation section: 21 CFR §862.1705, Triglyceride test system
Classification: Class I, Reserved
Product Code: CDT
Panel: Clinical Chemistry

6. **Predicate Device:**
Device Name: Dimension Clinical Chemistry Triglycerides FLEX reagent cartridge
Common Name: Dimension Clinical Chemistry Triglycerides reagent
510(k) Number: k010871
Panel: Clinical Chemistry
Manufacturer Siemens Healthcare Diagnostics, Inc.

7. **Intended Use:**
The ADVIA® Chemistry Triglycerides_2 assay (TRIG_2) is intended for *in vitro* diagnostic use in the quantitative measurement triglycerides in human serum and plasma on the ADVIA® Chemistry systems. Measurements of triglycerides are used in the diagnosis and treatment of patients with diabetes mellitus, nephrosis, liver obstruction, other diseases involving lipid metabolism, or various endocrine disorders.

8. **Indications for Use:**
Same as Intended Use

9. **Device Description:**
The Triglyceride_2 reagent is a ready-to-use liquid reagent packaged for use on the automated ADVIA 1800 Chemistry system. It is supplied as a 358 tests/wedge, 4 wedges/kit with a 38 mL fill in a 40 mL wedge size.
Existing Siemens Set-Point Chemistry calibrator (classified under CFR 862.1150 - calibrator, multi-analyte mixture, product code JIX), cleared under 510k k030169, is used to calibrate the assay on the ADVIA Chemistry systems.

10. **Test Principle:**
The Triglycerides method is based on the Fossati three-step enzymatic reaction with a Trinder endpoint. The single-reagent procedure measures the concentrations of the total triglycerides including mono and diglycerides and the free glycerol fractions. The triglycerides are converted to glycerol and free fatty acids by lipase. The glycerol is then converted to glycerol-3-phosphate by glycerol kinase followed by its conversion by glycerol-3-phosphate-oxidase to hydrogen peroxide. A colored complex is formed from hydrogen peroxide, 4-aminophenazone and 4-chlorophenol under the catalytic influence of peroxidase. The absorbance of the complex is measured as an endpoint reaction at 505/694 nm.

11. **Substantial Equivalence Information:**
Predicate device name: Dimension Clinical Chemistry Triglycerides FLEX Reagent cartridge
Predicate K number: k010871

Comparison with Predicate:

Item	New Device: ADVIA 1650 Chemistry Triglyceride (TRIG_2) Assay	Predicate Device: Dimension Clinical Chemistry Triglycerides FLEX Reagent cartridge (TGL)
Analyte	Triglycerides	Same
Intended Use	For *in vitro* diagnostic use in the quantitative measurement of triglycerides.	Same
Indications for Use	Measurements obtained by this device are used in the diagnosis and treatment of patients with diabetes mellitus, nephrosis, liver obstruction, other diseases involving lipid metabolism, or various endocrine disorders	Same
Instrument to be used	ADVIA 1800 Chemistry System	Dimension Clinical Chemistry system (XPand)
Measurement	quantitative	Same
Sample type	Serum, Plasma	Same

Reference interval	Normal: < 150 mg/dL Borderline high: 150–199 mg/dL High 200 – 499 mg/dL Very high > 500 mg/dL	Same
Format	Liquid	Same
Use of Calibrators	Yes	Same
Analytical measuring interval	10 - 550 mg/dL	15 – 1000 mg/dL
Method Principle	enzymatic	Same
Reagents	One Reagent	Same

12. Standard/Guidance Document Reference

- Interference Testing in Clinical Chemistry; Approved Guideline - Second Edition (CLSI EP7-A2)
- Evaluation of Detection Capability for Clinical Laboratory Measurement Procedures; Approved Guideline – Second Edition (CLSI EP17-A2)
- Evaluation of Precision Performance of Quantitative Measurement Methods; Approved Guideline-Second Edition (CLSI EP5-A2)

13. Performance Characteristics

The following data represent typical performance of the ADVIA Chemistry Triglycerides_2 assay and were collected on ADVIA 1800 Chemistry system. Substantial equivalence was demonstrated by testing several performance characteristics including imprecision, method comparison, interfering substances and analytical range. All of the evaluation studies gave acceptable results when compared to the predicate device. These studies support that the ADVIA® Chemistry Triglycerides_2 assay on ADVIA® 1800 Chemistry system is substantially equivalent to the predicate device.

1. Precision

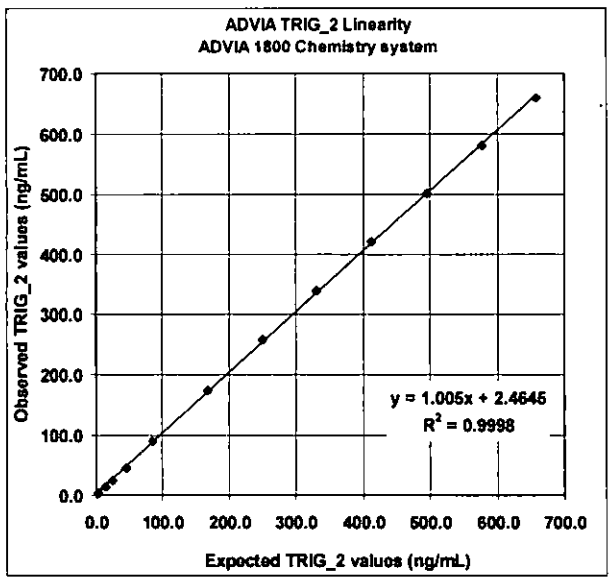
Within run and Total Precision were established by assaying serum sample pools and serum based controls. Each sample was assayed 2 replicates per run, 2 runs per day, for at least 20 days. Precision estimates were computed according to CLSI document EP5-A2, *Evaluation of Precision Performance of Quantitative Measurement Methods*; Approved Guideline.

		MEAN	Within Run		Between Run		Between Day		Total	
Product	N	mg/dL	SD	CV	SD	CV	SD	CV	SD	CV
Serum Control	80	183	1.60	0.9	0.42	0.2	0.64	0.3	1.77	1.0
Serum Control	80	92	0.28	0.3	0.31	0.3	0.71	0.8	0.82	0.9
Serum Pool	80	254	0.86	0.3	1.31	0.5	1.31	0.5	2.04	0.8
Serum Pool	80	503	1.16	0.2	0.89	0.2	1.37	0.3	2.00	0.4

2. Linearity/assay reportable range

A linearity study across the entire assay measuring range was assessed on ADVIA 1800 Chemistry system using low and high serum pools. The low and high pools were mixed to make nine (9) intermediate levels and additional 3 levels at the low end of the assay. All

samples were tested on the ADVIA 1800 Chemistry analyzer and the observed values were compared to the expected values. Linear/measuring range of the assay is 10 to 550 mg/dL with a deviation from linearity of ≤ 5%. The low end of the assay range is calculated based on the Limit of Quantitation. The high end of the assay range is based on the linearity calculations.



3. Limit of Blank, Limit of Detection, Limit of Quantitation

The estimations of the Limit of Blank (LoB), Limit of Detection (LoD) and Limit of Quantitation (LoQ) were performed according to CLSI guideline EP17-A2, Evaluation of Detection Capability for Clinical Laboratory Measurement Procedures. The LoB for the ADVIA Chemistry TRIG_2 assay on ADVIA 1800 Chemistry system is 5 mg/dL. The Limit of Detection (LoD) is the smallest amount that this assay can reliably detect to determine presence or absence of an analyte. The LoD for ADVIA Chemistry TRIG_2 assay on ADVIA 1800 Chemistry system is 8 mg/dL. LoB and LoD values are determined with proportions of false positives (α) less than 5% and false negatives (ß) less than 5%, based on 320 determinations with 160 blank and 160 low-level sample replicates. Limit of Quantitation (LoQ) is 10 mg/dL

4. Method comparison with predicate device

The performance of the ADVIA Chemistry Triglycerides_2 assay (y) for serum samples on ADVIA 1800 Chemistry system was compared with the performance of the predicate device. One hundred and one (101) serum samples with triglycerides concentrations throughout the range of the assay were tested. The results calculated using least squares linear regression (1st replicate) are as follows:

ADVIA Chemistry TRIG_2 on ADVIA 1800 Chemistry system = 0.94 (predicate device) + 4.4 mg/dL

Slope 95%CI: 0.93 to 0.95

Intercept 95% CI: 2.88 to 5.85

Sample range: 20 – 540 mg/dL

5. Matrix comparison with predicate device

The performance of the ADVIA Chemistry Triglycerides_2 assay (y) for plasma samples on ADVIA 1800 Chemistry systems was compared with the performance of the predicate device. Sixty plasma samples (Lithium Heparin and Potassium EDTA) with triglycerides concentrations throughout the range of the assay were tested in parallel on ADVIA 1800 Chemistry system and the predicate device. The results calculated using linear regression (1st replicate) are as follows:

ADVIA Chemistry TRIG_2 on ADVIA 1800 Chemistry system Plasma (Lithium Heparin) = 1.01 (predicate device) – 2.6 mg/dL
Slope 95% CI: 0.99 to 1.3
Intercept 95% CI: -5.95 to 0.73
Sample range: 34 – 509 mg/dL

ADVIA Chemistry TRIG_2 on ADVIA 1800 Chemistry system Plasma (Potassium EDTA) = 1.02 (predicate device) – 7.5 g/dL
Slope 95% CI: 1.00 to 1.03
Intercept 95% CI: -10.18 to -4.76
Sample range: 34 – 509 mg/dL

6. Analytical specificity

Interferences from icterus, hemolysis, ascorbic acid were evaluated in the ADVIA Chemistry TRIG_2 assay on ADVIA Chemistry 1800 system using a significance criterion of >10% bias. Bias is the difference in the results between the control sample (without the interferent) and the test sample (contains the interferent) expressed in percent. Bias exceeding 10% is considered interference.

Interferent	Interferent Level	Triglycerides Sample Concentration	Interference
Bilirubin (conjugated)	15 mg/dL	148.0 mg/dL	NSI*
	22.5 mg/dL	148.0 mg/dL	-12.0%
	30.0 mg/dL	505.0 mg/dL	NSI*
Bilirubin (unconjugated)	7.5 mg/dL	148.0 mg/dL	NSI*
	15.0 mg/dL	148.0 mg/dL	+12.4%
	30.0 mg/dL	506.0 mg/dL	NSI*
Hemolysis (hemoglobin)	500.0 mg/dL	138.0 mg/dL	NSI*
	750.0 mg/dL	138.0 mg/dL	+11.9%
	1000.0 mg/dL	473.0 mg/dL	NSI*
Ascorbic Acid	3.0 mg/dL	144.0 mg/dL	NSI*
	6.0 mg/dL	144.0 mg/dL	-13.1%
	12.0 mg/dL	492.0 mg/dL	NSI*

* - NSI = No Significant Interference. A percentage effect of ≥ 10% is considered a significant interference.

7. Reference Interval (Expected Values*)
Normal: < 150 mg/dL
Borderline high: 150 - 199 mg/dL
High: 200 - 499 mg/dL
Very High: > 500 mg/dL
* - Wu AHB. *Tietz Clinical Guide to Laboratory Tests*, 4th ed., Saunders Elsevier, St. Louis, MO. 2006:1074.

Siemens provides this information for reference. As with all *in vitro* diagnostic assays each laboratory should determine its normal range.

8. Stability:
Reagent: for opened products, once placed on the system reagents are stable for 60 days. The shelf life of the ADVIA Chemistry Albumin Triglycerides_2 Reagents is 12 months at 2-8°C. For unopened product, see the expiration date on the calibrator carton.

9. Traceability
The assay is traceable to the reference material SRM909c from the National Institute of Standards and Technology (NIST). Assigned values of the Siemens Chemistry Calibrator are traceable to this standardization

14. Clinical Studies
Not applicable.

15. Clinical cut-off
Not applicable

16. Conclusion
The ADVIA Chemistry Triglycerides_2 Assay (TRIG_2) is substantially equivalent in principle and performance to the Siemens Healthcare Diagnostics Dimension Triglycerides FLEX reagent cartridge cleared under k010871.

DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

Food and Drug Administration
10903 New Hampshire Avenue
Document Control Center – WO66-G609
Silver Spring, MD 20993-0002

November 22, 2013

SIEMENS HEALTHCARE DIAGNOSTICS, INC.
KIRA GORDON, PH.D.
SR. REGULATORY AFFAIRS SPECIALIST
511 BENEDICT AVE
TARRYTOWN NY 10591

Re: K133067
Trade/Device Name: ADVIA Chemistry Triglycerides_2 (TRIG_2) Reagent
Regulation Number: 21 CFR 862.1705
Regulation Name: Triglyceride test system
Regulatory Class: I, meets limitations of exemptions, 21 CFR 862.9(c)(4)
Product Code: CDT
Dated: September 26, 2013
Received: September 27, 2013

Dear Dr. Gordon:

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. 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 Parts 801 and 809); medical device reporting (reporting of medical device-related adverse events) (21 CFR 803); good manufacturing practice requirements as set forth in the quality systems (QS) regulation (21 CFR Part 820); and if applicable, the electronic product radiation control provisions (Sections 531-542 of the Act); 21 CFR 1000-1050.

If you desire specific advice for your device on our labeling regulations (21 CFR Parts 801 and 809), please contact the Division of Small Manufacturers, International and Consumer Assistance at its toll-free number (800) 638 2041 or (301) 796-7100 or at its Internet address http://www.fda.gov/MedicalDevices/ResourcesforYou/Industry/default.htm. Also, please note the regulation entitled, "Misbranding by reference to premarket notification" (21CFR Part 807.97). For questions regarding the reporting of adverse events under the MDR regulation (21 CFR Part 803), please go to http://www.fda.gov/MedicalDevices/Safety/ReportaProblem/default.htm for the CDRH's Office of Surveillance and Biometrics/Division of Postmarket Surveillance.

You may obtain other general information on your responsibilities under the Act from the Division of Small Manufacturers, International and Consumer Assistance at its toll-free number (800) 638-2041 or (301) 796-7100 or at its Internet address http://www.fda.gov/MedicalDevices/ResourcesforYou/Industry/default.htm.

Sincerely yours,

Carol C. Benson -S for

Courtney H. Lias, Ph.D.
Director
Division of Chemistry and Toxicology Devices
Office of In Vitro Diagnostics
and Radiological Health
Center for Devices and Radiological Health

Enclosure

DEPARTMENT OF HEALTH AND HUMAN SERVICES
Food and Drug Administration

Indications for Use

Form Approved: OMB No. 0910-0120
Expiration Date: December 31, 2013
See PRA Statement on last page.

510(k) Number *(if known)*
k133067

Device Name
ADVIA® Chemistry Triglycerides_2 (TRIG_2) Reagent

Indications for Use *(Describe)*
For in vitro diagnostic use in the quantitative measurement triglycerides in human serum or plasma on the ADVIA® Chemistry systems. Measurements obtained by this device are used in the diagnosis and treatment of patients with diabetes mellitus, nephrosis, liver obstruction, other diseases involving lipid metabolism, or various endocrine disorders.

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

☒ Prescription Use (Part 21 CFR 801 Subpart D) ☐ Over-The-Counter Use (21 CFR 807 Subpart C)

PLEASE DO NOT WRITE BELOW THIS LINE – CONTINUE ON A SEPARATE PAGE IF NEEDED.

FOR FDA USE ONLY

Concurrence of Center for Devices and Radiological Health (CDRH) *(Signature)*

Ruth A. Chesler -S