

**510(k) SUBSTANTIAL EQUIVALENCE DETERMINATION  
DECISION SUMMARY  
ASSAY ONLY TEMPLATE**

**A. 510(k) Number:**

k050632

**B. Purpose for Submission:** Notification of intent to manufacture and market the device: Bayer ADVIA® IMS Direct HDL Cholesterol Assay.

**C. Measurand:**

Direct HDL (High Density Lipoprotein) Cholesterol

**D. Type of Test:**

Immunoassay

**E. Applicant:**

Bayer HealthCare Diagnostics Division

**F. Proprietary and Established Names:**

Proprietary - Direct HDL Cholesterol for the ADVIA IMS

Established – Lipoprotein test system

**G. Regulatory Information:**

1. Regulation section:

21 CFR 862.1475 Lipoprotein Test System

2. Classification:

Class I, meets the limitations of exemptions 21 CFR 862.9 (c) (4). The device is an in vitro device that is intended for assessing the risk of cardiovascular disease.

3. Product code:

LBS

4. Panel:

75, Clinical Chemistry

**H. Intended Use:**

1. Intended use(s):

Please see indications for use below.

2. Indication(s) for use:

The Bayer ADVIA IMS Direct HDL Cholesterol (D-HDL) method is for in vitro diagnostic use to measure HDL Cholesterol in human serum and plasma. Such measurements are used in the risk assessment of cardiovascular diseases.

3. Special conditions for use statement(s):

For professional use only

4. Special instrument requirements:

For use on the Bayer ADVIA IMS Analyzer

**I. Device Description:**

The Bayer ADVIA IMS D-HDL reagent pack consists of two bottles R1 and R2. Each bottle is premixed ready to use reagent loaded directly upon the Bayer ADVIA IMS.

**J. Substantial Equivalence Information:**

1. Predicate device name(s):

Bayer ADVIA Chemistry Direct HDL Cholesterol Assay

2. Predicate 510(k) number(s):

k982341

3. Comparison with predicate:

	ADVIA IMS Direct HDL Cholesterol	ADVIA Chemistry Direct HDL Cholesterol (Predicate device)
Intended use	Similar	Similar
Summary	Similar	Similar
Principle	Similar	Similar
Reagents	Two liquid reagents contained in system specific packaging	Two liquid reagents contained in system specific packaging
Storage	2-8°C	2-8°C
Stability	45 days on-system without recalibration	1 month on-system without recalibration
Precautions	Similar	Similar
Indications of Deterioration	Similar	Similar
Performance Characteristics	Similar	Similar
Limitations	Similar	Similar
Parameters	R1, 14.2 uL; R2, 14.3 uL; Sample 1.5uL; 2-minute incubation of R1+S; 45 seconds final reaction	R1, 80uL; R2, 25uL; Sample pre-dilution 1+4 then 5uL. 5 minute incubation R1+S; 2.7 minutes final reaction

**K. Standard/Guidance Document Referenced (if applicable):**

Bayer uses protocols similar to those recommended in the following Clinical Laboratory and Standards Institute (CLSI) documents EP5-A *Precision performance of clinical chemistry devices*, EP9-A *Method comparison and bias estimation using patient samples*, EP-7 *Interference testing in clinical chemistry*, H18-A2 *Procedures for the handling and processing of blood specimens*

This method is not currently certified by the Cholesterol Reference Method Laboratory Network

**L. Test Principle:**

Immunoturbidometric

**M. Performance Characteristics (if/when applicable):**

1. Analytical performance:

*a. Precision/Reproducibility:*

Within run precision was performed on two systems B23 and B44 for ten days with two runs and two cups per run.

Table 1 System B23

	Days	Runs	N	Mean mg/dL	Within Run		Total	
					SD	%CV	SD	%CV
Control Level 1	10	20	40	37.04	1.05	2.8	1.21	3.3
Human Serum Pool	10	20	40	54.84	0.80	1.5	1.03	1.9
Calibrator	10	20	40	82.55	1.04	1.3	1.47	1.8

Table 2 System B44

	Days	Runs	N	Mean mg/dL	Within Run		Total	
					SD	%CV	SD	%CV
Control Level 1	10	20	40	34.52	1.04	3.0	1.08	3.1
Human Serum Pool	10	20	40	54.37	1.18	2.2	1.47	2.7
Calibrator	10	20	40	81.29	1.67	2.1	2.13	2.6

*b. Linearity/assay reportable range:*

A total of ten samples were prepared by mixing 0.9% saline and a high serum linearity pool that was prepared in-house. From the derived theoretical values (x) versus obtained values (y) with levels ranging from 7 mg/dL to 85 mg/dL, the following regression equation was obtained:  $y = 1.01207x - 0.22402$ ,  $r = 0.9987$ .

*c. Traceability, Stability, Expected values (controls, calibrators, or methods):*

The single level ADVIA Chemistry HDL/LDL Cholesterol calibrator is used to calibrate the ADVIA IMS DHDL method. This calibrator was previously approved for use on the ADVIA 1650 and 2400 systems. The calibrator is traceable via patient sample correlation to the Designated Comparison Method established by the National Cholesterol Education Program.

d. *Detection limit:*

Based upon the linearity data, the analytical range was established as 7 – 90 mg/dL

e. *Analytical specificity:*

Interference was evaluated by spiking human serum pools with hemoglobin, unconjugated bilirubin, conjugated bilirubin, and triglycerides. Intermediate dilutions were determined by diluting the spiked sample with undiluted sample. The observed recovery was considered to be of no clinical significance if the deviation for these potential interferences was  $\leq 10\%$ . Bilirubin (unconjugated) up to a level of 30 mg/dL, bilirubin (conjugated) up to a level of 20 mg/dL, hemoglobin up to a level of 500 mg/dL, and lipids up to a level of 1000 mg/dL did not interfere with the assay.

f. *Assay cut-off:*

Not applicable

2. Comparison studies:

a. *Method comparison with predicate device:*

Correlation was evaluated with human serum or plasma as appropriate in a protocol similar to CLSI document EP9-A. Regression data for each method indicate the linear least-squares fit between the ADVIA IMS system (y) and the predicate system/method (x).

Serum

Comparison Method	N	Regression Equation (y=)	R	S <sub>y,x</sub>	Range of Analyte Concentration
ADVIA 1650	100	$0.986 + 0.03 \quad 0.986 + 1.16$	0.988	$0.06 \quad 2.29$	0.36 – 2.23mmol/L 13.80 – 86.20 mg/dL

Plasma

Comparison Method	N	Regression Equation (y=)	R	S <sub>y,x</sub>	Range of Analyte Concentration
Plasma, lithium heparin	35	$0.973-0.00 \quad 0.973-0.02$	0.988	$0.05 \quad 2.11$	0.88 – 2.26 mmol/L 33.80 – 87.10 mg/dL
Plasma, di-potassium EDTA	35	$0.978-0.01 \quad 0.978-0.22$	0.988	$0.06 \quad 2.13$	0.88 – 2.26 mmol/L 33.80 – 87.10 mg/dL

*b. Matrix comparison:*

The serum/plasma equivalency study was run on the ADVIA IMS with matched human serum, lithium heparin plasma and potassium-EDTA plasma samples. The results are summarized below.

y	x	Slope	Intercept	Sy.x	r	n	Serum Range (mg/dL)
Lithium heparin plasma	serum	0.973	-0.02	2.11	0.988	35	33.8-87.1
Potassium-EDTA plasma	serum	0.978	-0.22	2.13	0.988	35	33.8-87.1

3. Clinical studies:

*a. Clinical Sensitivity:*

Not applicable

*b. Clinical specificity:*

Not applicable

c. Other clinical supportive data (when a. and b. are not applicable):

Not applicable

4. Clinical cut-off:

Not applicable

5. Expected values/Reference range:

Guidelines for reference ranges have been suggested by the Panel of the National Institutes of Health's Cholesterol Consensus Development Conference and adopted by the National Cholesterol Education Program.

The suggested guidelines of the Panel are as follows:

HDL Cholesterol	Classification
<1.0 mmol/L (40.00 mg/dL)	Low (undesirable, High risk)
≥1.6 mmol/L (60.00 mg/dl)	High (desirable, Low risk)

**N. Proposed Labeling:**

The labeling is sufficient and it satisfies the requirements of 21 CFR Part 809.10.

**O. Conclusion:**

The submitted information in this premarket notification is complete and supports a substantial equivalence decision.