

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

A. 510(k) Number:

k060429

B. Purpose for Submission:

Clearance of new device

C. Measurand:

Assayed controls for acetaminophen, amikacin, carbamazepine, digoxin, gentamicin, lidocaine, N-acetyl procainamide, phenobarbital, phenytoin, primidone, procainamide, quinidine, salicylate, theophylline, tobramycin, valproic acid and vancomycin.

D. Type of Test:

Not applicable.

E. Applicant:

Roche Diagnostics Corporation

F. Proprietary and Established Names:

TDM Control Set

G. Regulatory Information:

Product Code	Classification	Regulation Section	Panel
<u>Multi-Analyte Controls</u> <u>(Assayed And Unassayed)</u> <u>(JJY)</u>	<u>Class I</u>	<u>21 CFR 862.1660,</u> <u>Quality control</u> <u>material (assayed and</u> <u>unassayed).</u>	<u>75 Clinical</u> <u>Chemistry</u> <u>(CH)</u>

H. Intended Use:

1. Intended use(s):

See Indications for Use below.

2. Indication(s) for use:

The TDM Control Set is intended for use as an assayed quality control product on Roche/Hitachi and COBAS INTEGRA analyzers. Three assayed levels of acetaminophen, amikacin, carbamazepine, digoxin, gentamicin, lidocaine, N-acetyl procainamide, phenobarbital, phenytoin, primidone, procainamide, quinidine, salicylate, theophylline, tobramycin, valproic acid and vancomycin are provided.

3. Special conditions for use statement(s):

For Prescription use only

4. Special instrument requirements:

Roche/Hitachi and COBAS Integra analyzers

I. Device Description:

The TDM Control Set is a human serum based liquid control with seventeen added therapeutic drugs, preservative and stabilizer. The drugs are acetaminophen, amikacin, carbamazepine, digoxin, gentamicin, lidocaine, N-acetylprocainamide, phenobarbital, phenytoin, primidone, procainamide, quinidine, salicylate, theophylline, tobramycin, valproic acid and vancomycin.

Each TDM Control Set contains 2 bottles of controls (a 5.0 ml fill volume per bottle) at Levels 1, II and III.

J. Substantial Equivalence Information:

1. Predicate device name(s):

CLINIQA Liquid QC TDM Controls Levels, 1, 2, & 3

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

k041898

3. Comparison with the Predicate:

Similarities		
Item	Device	Predicate
Intended Use	Assayed quality control material	Same
Levels	Three	Same
Matrix	Human serum based liquid	Same

Differences		
Item	Device	Predicate
Number of Constituents	Seventeen	Nineteen
Constituents	acetaminophen, amikacin, carbamazepine, digoxin, gentamicin, lidocaine, N-acetylprocainamide, phenobarbital, phenytoin, primidone, procainamide, quinidine, salicylate, theophylline, tobramycin, valproic acid and vancomycin.	acetaminophen, amikacin, carbamazepine, disopyramide, digoxin, ethosuximide, gentamicin, lidocaine, N-acetylprocainamide, phenobarbital, phenytoin, primidone, procainamide, quinidine, salicylate,

Differences		
Item	Device	Predicate
Constituents		theophylline, tobramycin, valproic acid and vancomycin.
Target Range	Different assigned values	Different assigned values

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

1. ISO 14971:2000, Medical Devices – Application of risk management to medical devices.
2. FDA Guidance: Format for Traditional and Abbreviated 510(k)s.
3. FDA Guidance: Points to Consider Guidance Document on Assayed and Unassayed Quality Control Material; Draft.
4. FDA Guidance: Points to Consider for Review of Calibration and Quality Control Labeling for *In Vitro* Diagnostic Devices.

L. Test Principle:

Not applicable.

M. Performance Characteristics (if/when applicable):

1. Analytical performance:

a. Precision/Reproducibility:

Not applicable

b. Linearity/assay reportable range:

Not applicable

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

Roche Diagnostics maintains a set of master calibrators for each assay that have values assigned that are traceable to the various reference standards. The TDM Control Set products are assayed and traceable to USP standards. Values are assigned using the Hitachi 917, Module P and COBAS Integra 400/700/800 analyzers. A minimum of two independent series of analyses are performed on each instrument for each analyte. Each sample is tested in duplicate. The target value is then calculated as the median of the determined values. The following tables list lot-specific target values and ranges.

TDM Control Set		Lot 674373	Level 1	
Component	Method	Value	Range	Unit
Acetaminophen	COBAS INTEGRA	15.1	10.6 - 19.6	µg/mL
		100.0	70.0 - 130.0	µmol/L
	Roche/Hitachi Systems	11.2 74.1	7.9 - 14.5 51.9 - 96.3	µg/mL µmol/L
Amikacin	COBAS INTEGRA	5.33	4.25 - 6.41	µg/mL
		9.11	7.28 - 10.94	µmol/L
	ONLINE	5.14 8.79	3.91 - 6.37 6.69 - 10.89	µg/mL µmol/L
Carbamazepine	COBAS INTEGRA	3.30	2.64 - 3.96	µg/mL
		14.0	11.3 - 16.7	µmol/L
	CEDIA Roche/Hitachi	3.30	2.52 - 4.08	µg/mL
		14.0	10.7 - 17.3	µmol/L
Digoxin	ONLINE	3.28	2.62 - 3.94	µg/mL
		13.9	11.2 - 16.6	µmol/L
	COBAS INTEGRA	0.750	0.450 - 1.050	µg/mL
		0.960	0.576 - 1.344	µmol/L
Gentamicin	Tina-quant Roche/Hitachi	0.740	0.563 - 0.917	µg/mL
		0.947	0.719 - 1.175	µmol/L
	CEDIA Roche/Hitachi	1.29	0.90 - 1.68	µg/mL
		1.65	1.14 - 2.16	µmol/L
Lidocaine	COBAS INTEGRA	2.12	1.70 - 2.54	µg/mL
		4.43	3.53 - 5.33	µmol/L
	CEDIA Roche/Hitachi	1.97	1.49 - 2.45	µg/mL
		4.12	3.13 - 5.11	µmol/L
N-acetylprocainamide	ONLINE	2.07	1.65 - 2.49	µg/mL
		4.33	3.46 - 5.20	µmol/L
	COBAS INTEGRA	1.46	1.16 - 1.76	µg/mL
		6.23	4.97 - 7.49	µmol/L
Phenobarbital	COBAS INTEGRA	3.96	3.18 - 4.74	µg/mL
		14.3	11.3 - 17.3	µmol/L
	CEDIA Roche/Hitachi	3.87	2.94 - 4.80	µg/mL
		14.0	10.7 - 17.3	µmol/L
Phenytoin	COBAS INTEGRA	9.88	7.90 - 11.86	µg/mL
		42.6	34.2 - 51.0	µmol/L
	CEDIA Roche/Hitachi	9.42	7.53 - 11.31	µg/mL
		40.6	32.5 - 48.7	µmol/L
Primidone	COBAS INTEGRA	6.37	5.11 - 7.63	µg/mL
		25.2	20.1 - 30.3	µmol/L
	CEDIA Roche/Hitachi	6.67	5.08 - 8.26	µg/mL
		26.4	20.1 - 32.7	µmol/L
Procainamide	ONLINE	6.68	5.33 - 8.03	µg/mL
		26.5	21.1 - 31.9	µmol/L
	COBAS INTEGRA	2.67	2.13 - 3.21	µg/mL
		12.2	9.8 - 14.6	µmol/L
Procainamide	COBAS INTEGRA	1.76	1.40 - 2.12	µg/mL
		7.44	5.94 - 8.94	µmol/L
	CEDIA Roche/Hitachi	1.66	1.27 - 2.05	µg/mL
		7.02	5.34 - 8.70	µmol/L

TDM Control Set	Lot 674373	Level 1		
Component	Method	Value	Range	Unit
Quinidine	COBAS INTEGRA	1.06	0.85 - 1.27	µg/mL
		3.26	2.60 - 3.92	µmol/L
	ONLINE	0.980	0.746 - 1.214	µg/mL
		3.02	2.30 - 3.74	µmol/L
Salicylate	COBAS INTEGRA	43.1	34.4 - 51.8	µg/mL
		0.312	0.249 - 0.375	µmol/L
Theophylline	COBAS INTEGRA	5.36	4.28 - 6.44	µg/mL
		29.7	23.7 - 35.7	µmol/L
	CEDIA Roche/Hitachi	4.92	3.75 - 6.09	µg/mL
		27.3	20.7 - 33.9	µmol/L
	ONLINE	5.38	4.30 - 6.46	µg/mL
		29.9	23.9 - 35.9	µmol/L
Tobramycin	COBAS INTEGRA	1.55	1.25 - 1.85	µg/mL
		3.32	2.66 - 3.98	µmol/L
	CEDIA Roche/Hitachi	2.21	1.61 - 2.81	µg/mL
		4.73	3.44 - 6.02	µmol/L
Valproic acid	COBAS INTEGRA	36.2	29.0 - 43.4	µg/mL
		251	200 - 302	µmol/L
	CEDIA Roche/Hitachi	40.8	30.9 - 50.7	µg/mL
		283	214 - 352	µmol/L
Vancomycin	COBAS INTEGRA	6.87	5.49 - 8.25	µg/mL
		4.74	3.78 - 5.70	µmol/L

TDM Control Set	Lot 674373	Level II		
Component	Method	Value	Range	Unit
Acetaminophen	COBAS INTEGRA	34.7	27.8 - 41.6	µg/mL
		230	185 - 275	µmol/L
	Roche/Hitachi Systems	30.9	23.4 - 38.4	µg/mL
		205	157 - 253	µmol/L
Amikacin	COBAS INTEGRA	14.2	11.5 - 16.9	µg/mL
		24.3	19.5 - 29.1	µmol/L
	ONLINE	14.5	11.5 - 17.5	µg/mL
		24.8	19.7 - 29.9	µmol/L
Carbamazepine	COBAS INTEGRA	9.51	7.62 - 11.40	µg/mL
		40.2	32.1 - 48.3	µmol/L
	CEDIA Roche/Hitachi	9.30	7.08 - 11.52	µg/mL
		39.3	30.0 - 48.6	µmol/L
	ONLINE	10.1	8.0 - 12.2	µg/mL
		42.7	34.3 - 51.1	µmol/L
Digoxin	COBAS INTEGRA	1.72	1.39 – 2.05	µg/mL
		2.20	1.75 - 2.65	µmol/L
	Tina-quant Roche/Hitachi	1.80	1.38 - 2.22	µg/mL
		2.30	1.76 - 2.84	µmol/L
	CEDIA Roche/Hitachi	2.32	1.75 - 2.89	µg/mL
		2.97	2.25 - 3.69	µmol/L
Gentamicin	COBAS INTEGRA	5.28	4.23 - 6.33	µg/mL

TDM Control Set		Lot 674373	Level II	
Component	Method	Value	Range	Unit
	CEDIA Roche/Hitachi	11.0	8.9 - 13.1	µmol/L
		5.40	4.11 - 6.69	µg/mL
		11.3	8.6 - 14.0	µmol/L
	ONLINE	5.43	4.35 - 6.51	µg/mL
		11.3	8.9 - 13.7	µmol/L
Lidocaine	COBAS INTEGRA	4.26	3.42 - 5.10	µg/mL
		18.2	14.6 - 21.8	µmol/L
N-acetylprocainamide	COBAS INTEGRA	7.23	5.79 - 8.67	µg/mL
		26.1	21.0 - 31.2	µmol/L
	CEDIA Roche/Hitachi	7.19	5.45 - 8.93	µg/mL
		26.0	19.7 - 32.3	µmol/L
Phenobarbital	COBAS INTEGRA	23.1	18.6 - 27.6	µg/mL
		99.6	79.8 - 119.4	µmol/L
	CEDIA Roche/Hitachi	23.3	18.5 - 28.1	µg/mL
		100	79 - 121	µmol/L
Phenytoin	COBAS INTEGRA	12.3	9.9 - 14.7	µg/mL
		48.7	39.1 - 58.3	µmol/L
	CEDIA Roche/Hitachi	13.3	10.0 - 16.6	µg/mL
		52.7	40.1 - 65.3	µmol/L
	ONLINE	13.0	10.3 - 15.7	µg/mL
		51.5	41.3 - 61.7	µmol/L
Primidone	COBAS INTEGRA	7.74	6.18 - 9.30	µg/mL
		35.4	28.2 - 42.6	µmol/L
Procainamide	COBAS INTEGRA	7.30	5.83 - 8.77	µg/mL
		30.9	24.6 - 37.2	µmol/L
	CEDIA Roche/Hitachi	7.04	5.36 - 8.72	µg/mL
		29.8	22.6 - 37.0	µmol/L
Quinidine	COBAS INTEGRA	2.98	2.38 - 3.58	µg/mL
		9.18	7.35- 11.01	µmol/L
	ONLINE	2.90	2.33 - 3.47	µg/mL
		8.93	7.13 -10.73	µmol/L
Salicylate	COBAS INTEGRA	162	129 - 195	µg/mL
		1.17	0.93 - 1.41	µmol/L
Theophylline	COBAS INTEGRA	14.7	11.7 - 17.7	µg/mL
		81.6	65.4 - 97.8	µmol/L
	CEDIA Roche/Hitachi	14.1	10.8 - 17.4	µg/mL
		78.3	59.4 - 97.2	µmol/L
	ONLINE	14.6	11.6 - 17.6	µg/mL
		81.0	64.8 - 97.2	µmol/L
Tobramycin	COBAS INTEGRA	3.62	2.90 - 4.34	µg/mL
		7.75	6.19 - 9.31	µmol/L
	CEDIA Roche/Hitachi	4.86	3.54 - 6.18	µg/mL
		10.4	7.7 - 13.1	µmol/L
Valproic acid	COBAS INTEGRA	76.9	61.6 - 92.2	µg/mL
		533	425 - 641	µmol/L
	CEDIA Roche/Hitachi	85.2	64.8- 105.6	µg/mL
		590	449 - 731	µmol/L
Vancomycin	COBAS INTEGRA	22.3	17.8 - 26.8	µg/mL

TDM Control Set		Lot 674373		Level II	
Component	Method	Value	Range	Unit	
		15.4	12.4 - 18.4	µmol/L	

TDM Control Set		Lot 674373		Level III	
Component	Method	Value	Range	Unit	
Acetaminophen	COBAS INTEGRA	109	88 - 130	µg/mL	
		722	578 - 866	µmol/L	
	Roche/Hitachi Systems	105	81 - 129	µg/mL	
		695	527 - 863	µmol/L	
Amikacin	COBAS INTEGRA	26.4	21.0 - 31.8	µg/mL	
		45.1	36.1 - 54.1	µmol/L	
	ONLINE	29.8	23.8 - 35.8	µg/mL	
		51.0	40.8 - 61.2	µmol/L	
Carbamazepine	COBAS INTEGRA	15.6	12.6 - 18.6	µg/mL	
		66.0	52.8 - 79.2	µmol/L	
	CEDIA Roche/Hitachi	14.8	11.2 - 18.4	µg/mL	
		62.6	47.6 - 77.6	µmol/L	
	ONLINE	15.6	12.6 - 18.6	µg/mL	
		66.0	52.8 - 79.2	µmol/L	
Digoxin	COBAS INTEGRA	3.48	2.10 - 4.86	µg/mL	
		4.45	2.68 - 6.22	µmol/L	
	Tina-quant Roche/Hitachi	3.54	2.70 - 4.38	µg/mL	
		4.53	3.45 - 5.61	µmol/L	
	CEDIA Roche/Hitachi	3.95	2.99 - 4.91	µg/mL	
		5.06	3.86 - 6.26	µmol/L	
Gentamicin	COBAS INTEGRA	8.07	6.45 - 9.69	µg/mL	
		16.9	13.6 - 20.2	µmol/L	
	CEDIA Roche/Hitachi	8.31	6.06 - 10.56	µg/mL	
		17.4	12.6 - 22.2	µmol/L	
	ONLINE	8.31	6.66 - 9.96	µg/mL	
		17.4	13.8 - 21.0	µmol/L	
Lidocaine	COBAS INTEGRA	6.46	5.17 - 7.75	µg/mL	
		27.6	22.2 - 33.0	µmol/L	
N-acetylprocainamide	COBAS INTEGRA	12.1	9.7 - 14.5	µg/mL	
		43.7	35.0 - 52.4	µmol/L	
	CEDIA Roche/Hitachi	12.7	9.7 - 15.7	µg/mL	
		45.8	34.7 - 56.9	µmol/L	
Phenobarbital	COBAS INTEGRA	42.8	34.1 - 51.5	µg/mL	
		184	148 - 220	µmol/L	
	CEDIA Roche/Hitachi	45.3	36.3 - 54.3	µg/mL	
		195	156 - 234	µmol/L	
Phenytoin	COBAS INTEGRA	22.1	17.6 - 26.6	µg/mL	
		87.5	70.1 - 104.9	µmol/L	
	CEDIA Roche/Hitachi	24.0	18.3 - 29.7	µg/mL	
		95.0	72.2 - 117.8	µmol/L	
	ONLINE	22.8	18.3 - 27.3	µg/mL	
		90.3	72.3 - 108.3	µmol/L	
Primidone	COBAS INTEGRA	16.1	12.8 - 19.4	µg/mL	
		73.7	59.0 - 88.4	µmol/L	

TDM Control Set		Lot 674373		Level III	
Component	Method	Value	Range	Unit	
Procainamide	COBAS INTEGRA	11.5 48.6	9.1 - 13.9 39.0 - 58.2	µg/mL µmol/L	
	CEDIA Roche/Hitachi	10.6 44.8	8.2 - 13.0 34.0 - 55.6	µg/mL µmol/L	
Quinidine	COBAS INTEGRA	4.78 14.7	3.82 - 5.74 11.7 - 17.7	µg/mL µmol/L	
	ONLINE	4.59 14.1	3.66 - 5.52 11.4 - 16.8	µg/mL µmol/L	
Salicylate	COBAS INTEGRA	442 3.20	355 - 529 2.57 - 3.83	µg/mL µmol/L	
Theophylline	COBAS INTEGRA	29.5 164	23.5 - 35.5 131 - 197	µg/mL µmol/L	
	CEDIA Roche/Hitachi	28.5 158	21.6 - 35.4 119 - 197	µg/mL µmol/L	
	ONLINE	29.6 164	23.6 - 35.6 131 - 197	µg/mL µmol/L	
Tobramycin	COBAS INTEGRA	7.68 16.4	6.15 - 9.21 13.1 - 19.7	µg/mL µmol/L	
	CEDIA Roche/Hitachi	9.82 21.0	7.18 - 12.46 15.3 - 26.7	µg/mL µmol/L	
Valproic acid	COBAS INTEGRA COBAS INTEGRA	122 845	98 - 146 677 - 1.013	µg/mL µmol/L	
	CEDIA Roche/Hitachi	132 915	96 - 168 669 - 1.161	µg/mL µmol/L	
Vancomycin	COBAS INTEGRA	35.2	28.3 - 42.1	µg/mL	
		24.3	19.5 - 29.1	µmol/L	

The sponsor performed the following studies to verify the stability claims for the TDM Control Set.

Stability	Unopened	Opened
TDM Control Set	Store at 2 - 8°C until expiration date	12 months at 2–8°C.

Unopened: The TDM Control Set products were stored at 45°C for 10 days, 37°C every other day for 20 days, 32°C every third day for 30 days for a total of ten bottles per level. Each vial was assayed in triplicate using the Integra 400 and compared to the reference that was initially stored at -70°C. The product met the sponsor's acceptance criterion (95-105% of the reference). The sponsor is continuing real-time stability studies using the COBAS Integra TDM Assays on the Integra 400 or 700 analyzers.

Opened: The TDM Control Set products were sampled frequently over 120 days. Vials were tested every 30 days and compared to newly opened vials of TDM Control

Set products. The product met the sponsor's acceptance criterion (recovery at $\pm 5\%$ of the newly opened vials.) The sponsor is continuing opened vial real-time stability studies.

d. Detection limit:

Not applicable

e. Analytical specificity:

Not applicable

f. Assay cut-off:

Not applicable

2. Comparison studies:

a. Method comparison with predicate device:

Not applicable

b. Matrix comparison:

Not applicable

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:

Not applicable

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.