

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

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

k111677

**B. Purpose for Submission:**

To obtain substantial equivalence for the addition of Linezolid at concentrations of 0.12-16 µg/mL to the Microscan® MICroSTREP plus Panel.

**C. Measurand:**

Linezolid 0.12-16 µg/mL

**D. Type of Test:**

Quantitative growth-based detection algorithm using optics light detection

**E. Applicant:**

Siemens Healthcare Diagnostics, Inc.

**F. Proprietary and Established Names:**

MicroScan® MICroSTREP plus Panels

**G. Regulatory Information:**

1. Regulation section:

866.1640 - Antimicrobial Susceptibility Test Powder

2. Classification:

Class II

3. Product code:

LRG- Instrument for Auto Reader & Interpretation of Overnight Antimicrobial  
Susceptibility Systems

JWY - Manual Antimicrobial Susceptibility Test Systems

LTW – Susceptibility Test Cards, Antimicrobial

4. Panel:

83 Microbiology

**H. Intended Use:**

1. Intended use:

MicroScan® panels are designed for use in determining quantitative and/or qualitative antimicrobial agent susceptibility of colonies grown on solid media of aerobic streptococci including *S. pneumoniae*.

2. Indications for use:

The MicroScan® MICroSTREP plus Panels is used to determine quantitative and/or qualitative antimicrobial agent susceptibility of colonies grown on solid media of aerobic streptococci including *S. pneumoniae*. After inoculation, panels are incubated for 20 - 24 hours at 35°C +/- 1°C in a non-CO<sub>2</sub> incubator, and read visually. Alternatively, the panels can be incubated in and read by the MicroScan® WalkAway System, according to the Package insert.

This particular submission is for the addition of antimicrobial Linezolid at concentrations 0.12 to 16µg/mL to the test panel.

The organisms which may be used for susceptibility testing in this panel are:

*Streptococcus pneumoniae* (including multi-drug resistant strains)  
*Streptococcus pyogenes*  
*Streptococcus agalactiae*  
Viridans group *streptococci*

3. Special conditions for use statement(s):

- For prescription use only
- Turbidity inoculation method only

4. Special instrument requirements:

MicroScan® WalkAway® System is the alternate read method for Linezolid

**I. Device Description:**

The antimicrobial susceptibility tests are miniaturizations of the broth dilution susceptibility test that have been diluted in water and dehydrated. The antimicrobial agent is diluted in water, buffer or minute concentrations of broth to concentrations

bridging the range of clinical interest. Panels are rehydrated with 115µl Mueller-Hinton broth supplemented with 3% lysed horse blood (LHB), after inoculation of the broth with a standardized suspension of the organism. After incubation in a non-CO2 incubator for 20-24 hours, the minimum inhibitory concentration (MIC) for the test organism is manually read by observing the lowest antimicrobial concentration showing inhibition of growth. Alternatively, the panel can be incubated in and read by the MicroScan® WalkAway System.

**J. Substantial Equivalence Information:**

1. Predicate device name(s):  
MicroScan MICroStrep Panels- Levofloxacin
2. Predicate 510(k) number(s):  
k020556
1. Comparison with predicate:

<b>Similarities</b>		
<b>Item</b>	<b>Device</b>	<b>Predicate</b>
Intended use	MicroScan® panels are designed for use in determining quantitative and/or qualitative antimicrobial agent susceptibility of colonies, grown on solid media of aerobic streptococci including <i>S. pneumoniae</i> .	Same
Inoculum preparation	Inoculum prepared from isolated colonies using the Turbidity method	Same
Technology	Growth based after 20-24 hours	Same
Results	Report results as minimum inhibitory concentration (MIC) and categorical interpretation (SIR)	Same
<b>Differences</b>		
<b>Item</b>	<b>Device</b>	<b>Predicate</b>
Antibiotic	Linezolid	Levofloxacin
Instrument	WalkAway® or Manual visual read	Manual visual read

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

Class II Special Controls Guidance Document: Antimicrobial Susceptibility Test (AST) Systems; Guidance for Industry and FDA”; Clinical and Laboratory Standards

Institute (CLSI) M07-A8 “Methods for Dilution Antimicrobial Susceptibility Tests for Bacteria That Grow Aerobically; Approved Standard”; M100-S20 “Performance Standards for Antimicrobial Susceptibility Testing”

**L. Test Principle:**

The antimicrobial susceptibility tests are miniaturizations of the broth dilution susceptibility test that have been diluted in water and dehydrated. The antimicrobial agent is diluted in water, buffer or minute concentrations of broth to concentrations bridging the range of clinical interest. Panels are rehydrated with 115 µl Mueller-Hinton broth supplemented with 3% lysed horse blood (LHB), after inoculation of the broth with a standardized suspension of the organism. After incubation in a non-CO2 incubator for 20-24 hours, the minimum inhibitory concentration (MIC) for the test organism is manually read by observing the lowest antimicrobial concentration showing inhibition of growth. Alternatively, the panel can be incubated in and read by the MicroScan® WalkAway System.

**M. Performance Characteristics:**

1. Analytical performance:

a. *Precision/Reproducibility:*

Reproducibility was demonstrated using 10 isolates tested at three sites on three separate days in triplicates. The study included the turbidity inoculum method with reading performed manually, by WalkAway instrument. Both within site and site to site results were >95% reproducible.

Difference in the number of dilutions between the mode of the MicroScan® result and the actual result for between site reproducibility								
Inoculation Method	Read Method	Offscale	Minus 2 dilution	Minus 1 dilution	Exact	Plus 1 Dilution	Offscale	% Reproducible
Turbidity	Manual			21	231	18		100
Turbidity	WalkAway	1	1	41	215	11		99.3

b. *Linearity/assay reportable range:*

Not Applicable

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

The recommended QC isolate, *S. pneumoniae* ATCC 49619 was tested a sufficient number of times with acceptable results with the reference method.

Quality control results demonstrated the ability of the different reading parameters (manual, and WalkAway) by Turbidity inoculation methods to produce acceptable results.

The following table provides the frequency of the results in each concentration with the expected range stated.

<b>Linezolid</b>				
<b>Organism</b>	<b>µg/mL</b>			
<i>S. pneumoniae</i> ATCC 49619 Expected range 0.5- 2* µg/mL		Reference	Manual	WalkAway
	≤0.12			
	0.25			
	0.5		2	10
	1	87	109	99
	2	24		

\* This quality control range for *S. pneumoniae* is applicable tests performed by broth microdilution using cation-adjusted Mueller-Hinton broth with 2 - 5% lysed horse blood inoculated with a direct colony suspension and incubated in ambient air at 35°C for 20 to 24 hours.

Inoculum density control: A turbidity meter was used for the turbidity inoculation method. Inoculum density was controlled by monitoring the daily results of the MicroScan<sup>®</sup> Turbidity Meter to ensure the correct final concentration of the organisms for both the reference and test device.

*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:*

Clinical efficacy testing was conducted at three external sites using fresh isolates supplemented with stock isolates. The study included a total of 443 *Streptococci* isolates, with a no growth rate of 0.89% (4/447). There were 319 (72%) fresh and 124 (28%) stock isolates. There were 50 challenge isolates tested at one site and compared to the reference broth dilution result mode that was determined by previous testing of each isolate multiple times in the

recommended reference panel.

The recommended CLSI reference method was followed with the exception of the use of Pluronic-F® in the final inoculum. A validation of the use of Pluronic-F® in the frozen reference panels was conducted.

Efficacy testing was performed using the turbidity inoculation method and read manually after incubation for 20- 24 hours at 35°C +/- 1°C in a non-CO<sub>2</sub> incubator. A comparison to the reference method was provided with the following agreement.

Overall Performance Summary- Overnight Manual (Efficacy + Challenge)

	Total	EA	%EA	Total evaluable	EA of evaluable	%EA	CA	%CA	#NS	CA Err	
										#	%
<b>Efficacy</b>	443	429	96.8	435	427	98.2	442	99.8	1	1	0.2
<b>Challenge</b>	50	50	100	50	50	100	50	100	0	0	0
<b>Combined</b>	493	479	97.2	485	477	98.4	492	99.8	1	1	0.2

**EA** - Essential Agreement  
**CA** - Category Agreement  
**R**- Resistant

**maj** – Major Discrepancies  
**vmj** -- Very Major Discrepancies  
**min** – Minor Discrepancies

EA is when there is agreement between the reference method and the new method is within plus or minus one serial two-fold dilution of antibiotic. Category agreement (CA) is when the new method result interpretation agrees exactly with the reference panel result interpretation. Evaluable EA is when the MIC result is on scale for both the new method and the reference method and have on-scale EA.

It was noted in the Efficacy and Challenge studies that the trending of the *S. pneumoniae* read was generally one dilution lower when comparing to the reference read. The *S. pneumoniae* isolates tested were close to the breakpoint of 2µg/mL and a limitation is in place.

The performance of the alternate MicroScan® WalkAway System (incubation and read methods) was demonstrated in challenge, quality control, and reproducibility studies with acceptable results.

*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:

The expected value range, interpretive criteria and QC for the MICroSTREP plus panels are included in the package insert.

*Streptococcus* spp, including *S. pneumoniae*

≤2 (S), --, --

The current absence of data on resistant strains precludes defining any categories other than “Susceptible.” Strains yielding test results suggestive of a “nonsusceptible” category should be retested, and if the result is confirmed, the isolate should be submitted to a reference laboratory for further testing.

**N. Proposed Labeling:**

The labeling is sufficient and 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.