March 18, 2019

Beckman Coulter
Radha Goolabsingh
Director, Regulatory Affairs
11800 SW 147th Ave
Miami, Florida 33196-2500

Re: K181599
Trade/Device Name: Unicel DxH 800 Cellular Analysis System with Early Sepsis Indicator Application
Regulation Number: 21 CFR 866.3215
Regulation Name: Device to detect and measure non-microbial analyte(s) in human clinical specimens to aid in assessment of patients with suspected sepsis.
Regulatory Class: Class II
Product Code: QFS, GKZ
Dated: June 15, 2018
Received: June 18, 2018

Dear Radha Goolabsingh:

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 and Part 809); 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/CombinationProducts/GuidanceRegulatoryInformation/ucm597488.htm); 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 http://www.fda.gov/MedicalDevices/Safety/ReportaProblem/default.htm.

For comprehensive regulatory information about medical devices and radiation-emitting products, including information about labeling regulations, please see Device Advice (https://www.fda.gov/MedicalDevices/DeviceRegulationandGuidance/) and CDRH Learn (http://www.fda.gov/Training/CDRHLearn). 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 (http://www.fda.gov/DICE) for more information or contact DICE by email (DICE@fda.hhs.gov) or phone (1-800-638-2041 or 301-796-7100).

Sincerely,

Steven R. Gitterman -S for

Uwe Scherf, Ph.D.
Director
Division of Microbiology 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: 06/30/2020
*See PRA Statement below.*

510(k) Number *(if known)*
K181599

Device Name
UniCel DxH 800 Coulter Cellular Analysis System with Early Sepsis Indicator Application

Indications for Use *(Describe)*
The Unicel DxH 800 Coulter Cellular Analysis System with Early Sepsis Indicator Application is the quantitative measurement of Monocyte Distribution Width (MDW). The Early Sepsis Indicator is intended for use with adult patients presenting to the emergency department, on whom a white cell differential test has been ordered.

MDW is measured from a (K2EDTA) whole-blood venous sample within 2 hours of collection. MDW values greater than 20.0 together with other laboratory findings and clinical information, aids in identifying patients with sepsis or at increased risk of developing sepsis within the first 12 hours of hospital admission.

MDW values greater than 20.0 should be interpreted in association with other clinical information and diagnostic testing, as a proportion of patients without sepsis may have an elevated MDW value at baseline.

MDW values less than or equal to 20.0 cannot rule out sepsis or the development of sepsis within 12 hours of hospital admission. The Early Sepsis Indicator should not be used as the sole basis to determine the absence of sepsis.

The predictive value of the Early Sepsis Indicator for identifying sepsis in patients with hematological abnormalities has not been established.

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.**

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**Section 5.0: – 510(k) Summary**

# 510(k) Summary for Unicel DxH 800 Coulter Cellular Analysis System with Early Sepsis Indicator Application

## 510(k) Owner / Submitter Information

Name: Beckman Coulter Inc.
Address: 11800 SW 147th Ave., Miami, FL 33196
Cellular: 786-423-4575
Desk Phone #: (305) 380-2584
Fax: (786) 639-2584
Contact Person: Radha Goolabsingh
Email Address: rgoolabsingh@beckman.com

**Date Submitted:** June 15, 2018

## Device Name and Classification

Trade Name: Unicel DxH 800 Coulter Cellular Analysis System with Early Sepsis Indicator Application
Common Name: Early Sepsis Indicator
Classification: Class II (Special Controls)
Classification Name: Device to detect and measure non-microbial analyte(s) in human clinical specimens to aid in assessment of patients with suspected sepsis (21 CFR 866.3215)
Product Code: QFS
Panel: 83- Division of Microbiology Devices
Unicel DxH 800 Cellular Analysis System - Last 510(k) Clearance: K140911, 09/05/2014

## Predicate Device Information

| Predicate Product | 510(k) Number | Date Cleared | Classification | 21 CFR | Product Code |
|---|---|---|---|---|---|
| VIDAS BRAHMS PCT (PCT) | K162827 | 02/23/2017 | Class II (Special Controls) | 866.3215 | PMT |

## Device Description

### Systems Overview

The Early Sepsis Indicator (ESI) requires the use of the UniCel DxH 800 Coulter Cellular Analysis System (DxH 800) and its reagents, controls and calibrators last cleared under 510(k) K140911.

The UniCel DxH 800 Coulter Cellular Analysis System contains a quantitative, automated hematology analyzer (DxH 800) designed for *in vitro* diagnostic use in screening patient populations by clinical laboratories. The system provides a Complete Blood Count (CBC), Leukocyte 5 Part Differential (Diff), Reticulocyte (Retic), Nucleated Red Blood Cell (NRBC) on whole blood, as well as, Total Nucleated Count (TNC), and Red Cell Count (RBC) on Body Fluids (cerebrospinal, serous and synovial). This submission adds a new parameter, Monocyte Distribution Width (MDW) to those mentioned above. This parameter has been shown to aid in the early detection of Sepsis in emergency room patients.

The system consists of two primary components, the workstation and the DxH 800 analyzer as shown in Figure 1. DxH 800 System Configuration. The primary function of the DxH 800 analyzer is to process samples and provide results to the workstation. The primary functions of the workstation are: user interface, system control, results processing and storage and external communications. The analyzer runs embedded code and the workstation runs Microsoft Windows 7 Operating System (OS).

Optionally, the workstation can be connected to:

- A printer for creating reports;
- A Laboratory Information System (LIS) for receiving test orders and releasing results; and
- Pro-Service Remote Management System (RMS) which provides secure access to the DxH800 workstation for BCI Service Personnel to perform troubleshooting, system monitoring and for assisting customers.

The version of the system proposed in this submission is DxH800 v3.8.0 This system is an update to DxH800 v3.0.0 (see K140911) to add a new feature.

Neither the system architecture nor the top-level software architecture have been modified from DxH800 v3.0 to add the Early Sepsis Indicator feature.

The DxH 800 v.3.8.0 user interface and labeling will be offered in English in the U.S. and in French, German, Italian, Spanish, Japanese, Chinese and English outside the U.S.

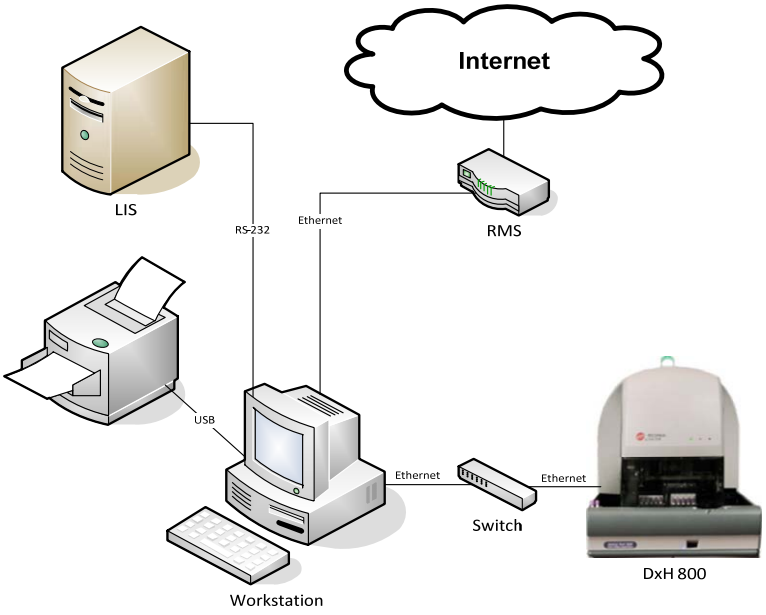


**Figure 1. DxH 800 System Configuration**

Additionally, the UniCel DxH 800 Coulter Cellular Analysis System with Early Sepsis Indicator Application uses the currently cleared controls and calibrator provided in Table 1 below.

**Table 1: Summary of Device Components, Product Description, Proposed Classification and Proposed Predicate:**

| Product | 510(k) Clearance Status | Description | Classification | Proposed Predicate |
|---|---|---|---|---|
| DxH 800 Hematology Analyzer | Existing Product (cleared under K140911)<br><br>**Modified-** Addition of new parameter (MDW) requiring Software algorithm modifications | The UniCel DxH 800 COULTER Cellular Analysis System (DxH 800) is intended for In Vitro Diagnostic Use in clinical laboratories. The DxH 800 System provides automated complete blood count, leukocyte differential, nucleated red blood cell (NRBC) enumeration and reticulocyte analysis as well as an automated method for enumeration of the Total Nucleated Cells (TNC) and Red Blood Cells (RBC) in body fluids. | Class II, GKZ, 864.5220, Hematology, Automated Differential Cell Counter<br><br>Early Sepsis Indicator Application: 866.3215, Product code (QFS) | VIDAS B.R.A.H.M.S. PCT (PCT) (K16287)<br><br>(Paper Predicate) |
| COULTER DxH Diff Pack | Existing Product (Included in K140911)<br>**No change** | The COULTER DxH Diff Pack is an erythrolytic reagent and a leukocyte preservative used to perform a five-part differential analysis using VCSn technology on the DxH 800/DxH 600. | Class I Exempt, GGK, 864.8540, Hematology, Red cell lysing reagent | N/A |
| COULTER DxH Diluent | Existing Product (Included in K140911)<br>**No change** | COULTER DxH Diluent provides the ability to analyze portions of the diluted blood samples for different blood cell types and measure hemoglobin on the DxH 800/600. Acts as a rinsing agent on all DxH Systems. | Class I Exempt, GIF, 864.8200, Hematology, Blood cell diluent | N/A |
| COULTER DxH Cleaner | Existing Product (Included in K140911)<br>**No change** | DxH Cleaner is a cleaning agent for use on the DxH System components that come in contact with blood samples. | Class I Exempt, JCB, 864.4010, Hematology, General Purpose Reagent | N/A |
| COULTER 6C Plus Cell Control | Existing Product (6C Cell Control) (cleared under K081822) | COULTER 6C Plus Cell Control is an integrated control that enables monitoring of system performance for CBC, Diff, NRBC, MDW and LDW parameters. The COULTER 6C Plus Cell Control | Class II, Exempt, JPK, 864.8625, Hematology, Quality Control Mixture | COULTER 6C Cell Control (K081822) |

| Product | 510(k) Clearance Status | Description | Classification | Proposed Predicate |
|---|---|---|---|---|
| | **Modified** - to provide two new parameters (LDW and MDW) for control monitoring of the calculation of cellular dispersion | proposed for use with the Sepsis Application is the current COULTER 6C Cell Control (K081822), assayed to include values for the MDW and LDW parameters. LDW is not intended for the reporting of patient results. | | |
| COULTER Latron CP-X Control | Existing Product (cleared under K885028)<br><br>**Modified** - with tighter expected ranges for control monitoring of the differential volume measurement | COULTER LATRON CP-X is a suspension of stable polystyrene particles of uniform size with a diameter CV of ≤3.0%. Latron CP-X is used by customers as part of the daily quality control procedure to monitor the stability of the electrical processing and the fluidic flow rate systems used to measure the volume (size), conductivity and light scattering characteristics of cells as they pass through the flow cell. It is also used by Beckman Coulter manufacturing and service engineers to calibrate the differential volume measurements | Class II, GKL, 864.5220, Hematology, Automated Differential Cell Counter | COULTER Latron CP-X Control (K885028) |
| *Coulter S-CAL Calibrator | Existing Product (cleared under K840794 )<br>**No change** | The current COULTER S-CAL Calibrator used with the DxH 800 is intended for customers to determine the calibration factors for directly measured CBC parameters; it is not required differential parameters | Class II, Exempt, KRY, 864.8175, Calibrator for Platelet Counting | N/A |

*Note: The current COULTER S-CAL Calibrator used with the DxH 800 is intended for customers to determine the calibration factors for directly measured CBC parameters; it is not required for differential parameters. Since the MDW and LDW parameters are derived from the monocyte and lymphocyte differential, the use of a calibrator by the customer is not required for the Sepsis Application.

**Intended Use:**

**UniCel DxH 800 Coulter Cellular Analysis System with Early Sepsis Indicator Application:**

The Unicel DxH 800 Coulter Cellular Analysis System with Early Sepsis Indicator Application is the quantitative measurement of Monocyte Distribution Width (MDW). The Early Sepsis Indicator is intended for use with adult patients presenting to the emergency department, on whom a white cell differential test has been ordered.

MDW is measured from a (K2EDTA) whole-blood venous sample within 2 hours of collection. MDW values greater than 20.0 together with other laboratory findings and clinical information, aids in identifying patients with sepsis or at increased risk of developing sepsis within the first 12 hours of hospital admission.

MDW values greater than 20.0 should be interpreted in association with other clinical information and diagnostic testing, as a proportion of patients without sepsis may have an elevated MDW value at baseline.

MDW values less than or equal to 20.0 cannot rule out sepsis or the development of sepsis within 12 hours of hospital admission. The Early Sepsis Indicator should not be used as the sole basis to determine the absence of sepsis.

The predictive value of the Early Sepsis Indicator for identifying sepsis in patients with hematological abnormalities has not been established.

**Indication for Use:**

See Intended Use above.

**Overall Comparison between Early Sepsis Indicator and the Predicate:**

Table 2 provides an overall comparison of the differences and similarities against the Predicate Device (VIDAS BRAHMS PCT (PCT) K162827).

**Table 2: Overall Comparison between ESI and the Predicate**

| Item | DxH 800 Coulter Cellular Analysis System with Early Sepsis Indicator Application | Predicate Device (Paper Predicate) VIDAS BRAHMS PCT (PCT) K162827 |
|---|---|---|
| Intended Use and Indications for Use | The Unicel DxH 800 Coulter Cellular Analysis System with Early Sepsis Indicator Application is the quantitative measurement of Monocyte Distribution Width | VIDAS B·R·A·H·M·S PCT (PCT) is an automated test for use on the instruments of the VIDAS family for the determination of human procalcitonin in human serum or plasma (lithium heparinate) using the ELFA (Enzyme-Linked Fluorescent Assay) technique. |

| Item | DxH 800 Coulter Cellular Analysis System with Early Sepsis Indicator Application | Predicate Device (Paper Predicate) VIDAS BRAHMS PCT (PCT) K162827 |
|---|---|---|
| | (MDW). The Early Sepsis Indicator is intended for use with adult patients presenting to the emergency department, on whom a white cell differential test has been ordered.<br><br>MDW is measured from a (K2EDTA) whole-blood venous sample within 2 hours of collection. MDW values greater than 20.0 together with other laboratory findings and clinical information, aids in identifying patients with sepsis or at increased risk of developing sepsis within the first 12 hours of hospital admission.<br><br>MDW values greater than 20.0 should be interpreted in association with other clinical information and diagnostic testing, as a proportion of patients without sepsis may have an elevated MDW value at baseline.<br><br>MDW values less than or equal to 20.0 cannot rule out sepsis or the development of sepsis within 12 hours of hospital admission. The Early Sepsis Indicator should not be used as the sole basis to determine the absence of sepsis.<br>The predictive value of the Early Sepsis Indicator for identifying sepsis in patients with hematological | Used in conjunction with other laboratory findings and clinical assessments, VIDAS BRAHMS PCT is intended for use as follows:<br>• to aid in the risk assessment of critically ill patients on their first day of ICU admission for progression to severe sepsis and septic shock,<br>• to aid in assessing the cumulative 28-day risk of all-cause mortality for patients diagnosed with severe sepsis or septic shock in the ICU or when obtained in the emergency department or other medical wards prior to ICU admission, using a change in PCT level over time<br>•to aid in decision making on antibiotic therapy for patients with suspected or confirmed lower respiratory tract infections (LRTI) defined as community-acquired pneumonia (CAP), acute bronchitis, and acute exacerbation of chronic obstructive pulmonary disease (AECOPD) – in an inpatient setting or an emergency department,<br>• to aid in decision making on antibiotic discontinuation for patients with suspected or confirmed sepsis. |

| Item | DxH 800 Coulter Cellular Analysis System with Early Sepsis Indicator Application | Predicate Device (Paper Predicate) VIDAS BRAHMS PCT (PCT) K162827 |
|---|---|---|
| | abnormalities has not been established. | |
| Specimen | Venous Whole Blood | Human Serum or Plasma (lithium heparinate) |
| Analyte | MDW Parameter | Procalcitonin (PCT) |
| Automated | Automated Hematology Analyzer | Automated Assay |
| Assay Technique | Whole blood analysis and cellular differentiation on the DxH800 | ELFA (Enzyme-Linked Fluorescent Assay) technique |
| Assay Principle | Coulter Principle:<br>Volume, Conductivity, Light Scatter Analysis (VCSn) Technology using :<br>Aperture impedance (DC)<br>Conductivity (RF)<br>Laser Light Scatter (Multiple angles)<br>Laser Light Absorbance | Immunoassay based on sandwich principle |
| Detection method | VCSn | Fluorescence (ELFA) of 4-methy-umbelliferyl measured at 450 nm |
| Assay/Parameter Duration | ≥90 specimens per hour (40 sec/cycle) for CBC and Diff with NRBC cycle (approximately 40 seconds per sample) | Approximately 20 minutes |
| Combination Devices | N/A | Instruments of the VIDAS family: VIDAS, miniVIDAS or VIDAS 3 |
| Antibodies | N/A | Conjugate: Alkaline phosphatase-labeled mouse monoclonal anti-human procalcitonin<br><br>Solid phase: Mouse monoclonal anti-procalcitonin immunoglobulins coated on interior of the SPRSample |
| Sample Volume | Automatic, cap-piercing 165 µL | 200 µL |

**Table 3: Summary of the MDW Parameter Performance Testing**

| Study | Testing Approach | FDA Guidance Documents | Standards/ References | Testing Results |
|---|---|---|---|---|
| **Performance - Bench Testing** | | | | |
| **Effect of Incomplete Lysing on MDW** | To evaluate the effect of incomplete lysing on the MDW parameter results | None | None | The addition of the incomplete lysis flagging condition causes less than 1.2% of the clinical specimens to have the MDW inhibited. At this rate of flagging the clinical utility of the MDW is not diminished. |
| **Specimen Stability** | To characterize the specimen age profile for the MDW parameter on the DxH 800 system using venous whole blood stored at room temperature. | None | CLSI EP25-A: Evaluation of Stability of In Vitro Diagnostic Reagents; Approved Guideline – September 2009 | MDW trends as sample ages. The trend exhibits a quadratic pattern and tends to plateau after 4 hours.<br><br>Consistent with published literature on monocyte morphological changes, this study shows MDW values tend to increase over the first 3 hours from the draw time and then plateau from 4 to 8 hours post draw at room temperature |

| Study | Testing Approach | FDA Guidance Documents | Standards/ References | Testing Results |
|---|---|---|---|---|
| **Comparability – Specimen Tube Diameter** | To evaluate the effect of mixing using the smaller diameter 8 mm and 11 mm tubes as compared to the standard 13 mm tube on the MDW parameter results. | None | CLSI H26-A2: Validation, Verification and Quality Assurance of Automated Hematology Analyzers; Approved Standard – Second Edition - June 2010<br><br>EP09-A3: Measurement Procedure Comparison and Bias Estimation Using Patient Samples; Approved Guideline - Third Edition – August 2013 | The MDW reported from 8 mm and 11 mm diameter tubes is equivalent to the MDW reported from the 13 mm diameter tube. |
| **Comparibility – Sampling modes** | To assess the impact on MDW parameter results due to sampling via the Closed Vial Cassette sampling mode and the Open Vial Single-Tube sampling mode on the DxH 800. | None | CLSI H26-A2: Validation, Verification and Quality Assurance of Automated Hematology Analyzers; Approved Standard – Second Edition - June 2010<br><br>CLSI EP09-A3: Measurement Procedure Comparison and Bias Estimation Using Patient Samples; Approved Guideline - Third Edition - August 2013 | Testing of the MDW parameter in the Open Vial Single-Tube sampling mode was found to be equivalent to the Closed Vial Cassette sampling mode. |

| | | | | |
|---|---|---|---|---|
| **Interfering Substances** | To assess the effect of interfering substances (lipemia, bilirubin and hemoglobin) on the measurement of the MDW parameter on the DxH 800 system. | None | CLSI H26-A2: Validation, Verification and Quality Assurance of Automated Hematology Analyzers - June 2010<br><br>CLSI C56-A: Hemolysis, Icterus, and Lipemia/Turbidity Indices as Indicators of Interference in Clinical Laboratory Analysis; Approved Guideline - July 2012<br><br>CLSI EP07-A2: Interference testing in Clinical Chemistry; Approved Guideline – Second Edition - November 2005 | Lipids (Triglycerides) at a maximum concentration of 1500 mg/dL do not interfere with MDW measurement.<br><br>Conjugated bilirubin at the maximum concentration of 40 mg/dL does not interfere with the MDW parameter.<br><br>Unconjugated bilirubin at the maximum concentration of 20 mg/dL does not interfere with the MDW parameter.<br><br>Free HGB at a maximum concentration of 1.87 g/dL does not interfere with MDW measurement.<br><br>Hemolysis at a maximum of 2.02 g/dL does not interfere with MDW measurement. |

| Study | Testing Approach | FDA Guidance Documents | Standards/ References | Testing Results |
|---|---|---|---|---|
| **Performance - Clinical Testing** | | | | |
| **System Precision - Repeatability and Reproducibility** | To assess the system precision of the MDW parameter using COULTER 6C Plus Cell Controls on the DxH 800 system. | Class II Special Controls Guidance Document: Premarket Notifications for Automated Differential Cell Counters for Immature or Abnormal Blood Cells; Final Guidance for Industry and FDA December 4, 2001 – Section 13: Specimens. | CLSI EP05-A3 Evaluation of precision of Quantitative Measurement Procedures ; Approved Guideline – Third Edition | Repeatability and Reproducibility study met precision specification of ≤ 10% CV and ≤15% CV, respectively by site and all sites combined. |
| **System Precision- Repeatability Profile** | To demonstrate the system precision performance of MDW on the DxH 800 | Class II Special Controls Guidance Document: Premarket Notifications for Automated Differential Cell Counters for Immature or Abnormal Blood Cells; Final Guidance for Industry and FDA December 4, 2001 – Section 13: Specimens. | CLSI H26-A2 Validation, Verification, and Quality Assurance of Automated Hematology Analyzers, Approved Standard – 2nd Edition; June 2010<br><br>CLSI EP05-A3 Evaluation of precision of Quantitative Measurement Procedures ; Approved Guideline – Third Edition | System repeatability performance acceptance criteria were ≤ 10% for all parameters. |

| Study | Testing Approach | FDA Guidance Documents | Standards/ References | Testing Results |
|---|---|---|---|---|
| **Adult Reference Interval** | To assess the normal reference interval of MDW for apparently healthy adult males and females. A total of 146 specimens were collected consisting of 70 females and 76 males to establish the normal reference interval of MDW. | None | CLSI EP28-A3c, Defining, Establishing, and Verifying Reference Intervals in the Clinical Laboratory; Approved Guideline, (10/2010) | The adult normal reference interval assessed for MDW on the DxH 800 system across all sites was found to be between the lower limit of 13.98 and the upper limit of 21.28. Data was included in the product labeling, however the upper limit of normal will not be used for MDW decision-making. |

| Study | Testing Approach | FDA Guidance Documents | Standards/ References | Testing Results |
|---|---|---|---|---|
| **Clinical Accuracy** | To assess the diagnostic ability of MDW. A multi-center prospective cohort study was conducted to clinically validate the performance of Monocyte Volume Distribution Width (MDW) parameter on the DxH 800 hematology analyzer, as an aid in the early detection of sepsis in adult patients presenting to the emergency department (ED). | Class II Special Controls Guidance Document: Premarket Notifications for Automated Differential Cell Counters for Immature or Abnormal Blood Cells; Final Guidance for Industry and FDA December 4, 2001<br><br>Statistical Guidance on Reporting Results from Studies Evaluating Diagnostic Tests; Final Guidance for Industry and FDA Staff; March 2007 | CLSI EP12-A2: User Protocol for Evaluation of Qualitative Test Performance; Approve Guideline. Second Edition guideline.<br><br>CLSI EP24-A2: Assessment of the Diagnostic Accuracy of Laboratory Tests Using Receiver Operating Characteristic Curves; Approved Guideline – Second Edition. 2011. | The study results support the proposed intended use and indications for use. The study validated the two (2) predefined cut-offs and demonstrated that the lower limit of sensitivity and specificity were within acceptance criteria for both cut-offs. However, the study demonstrated that an MDW cut-off of 20.0 units provided an optimum diagnostic ability by balancing the ability to detect positive patients (sensitivity) and negative patients (specificity) and this is the cut-off selected. |

**Substantial Equivalence Conclusion:**

The conclusions drawn from the testing discussed in **Section 20**, which demonstrate clinical accuracy (sensitivity and specificity) of the MDW parameter and together with multiple literature citations (as provided in this submission), supports the use of MDW as an aid in the early detection of adult patients with or developing sepsis.

Furthermore, it can be concluded that the submitted information in this premarket notification is complete, offers a reasonable assurance of safety and effectiveness and supports a substantial equivalence determination for the DxH 800 Coulter Cellular Analysis System with Early Sepsis Indicator Application.