

# LIS Vendor Interface Document

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## **Change History**

Revision	Date	Pages	Reason
(A)	10/99	All	New manual release
(B)	3/00	All	New fields added to EpiCenter interface to support Phoenix ID/AST instrument data. Added Isolate results reporting for EpiCenter. Added additional results for tests. And changed Patient and Specimen user defined fields 4 & 5 to free text fields.
(C)	3/01	All	Added BD Phoenix 100 section. Updated list of antibiotic and organism codes. EpiCenter uploads chartable rules and special messages. EpiCenter allows blanking of a field. EpiCenter adds fields for excluding isolates from statistics and test complete DT.
(D)	5/01	2, 17, 18, 22, 28, 61-63, 65	Updated orders record to incorporate critical panel specification. Updated result record to include resistance markers 4 – 10. Changed 'resistance mechanism' to 'resistance marker' throughout. Changed "BACTEC9000" to "BT9000" in instrument type result field. Fix Phoenix resistance marker result upload example.
(E)	10/01	All	Formatting changes
(F)	3/02	All	Various updates throughout the document to cleanup references/definitions and lists of information.
(G)	12/03	All	Updates for EpiCenter Version 4 Features
(H)	12/03	18,31,63,65-76	Updates for Phoenix Version 4
(I)	-	-	Skipped
(J)	4/14/04	All	Phoenix Version 4.01Z and EpiCenter 4.10A updates, BD ProbeTec ET and Viper SP updates for new configuration options, status, and assay type list.
(K)	03/14/05	All	Various updates throughout the document to cleanup examples.

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## 1. Purpose

This document is intended to provide the information necessary for an LIS to exchange medical data with Becton Dickinson instruments. This document was written to include the specifications for the BD data management system as well as all future BD instruments. Any differences between instrument and data management communication are outlined in this documents appendix.

## 2. Scope

This document details the interface between a Laboratory Information System and Becton Dickinson instruments and the Becton Dickinson data management system. The interface uses the ASTM E\_1381 protocol at the physical layer and the ASTM E\_1394 protocol at the logical layer.

## 3. Definitions

- LIS Laboratory Information System; Computer system present in most microbiology labs responsible for collecting patient and test data.
- **ASTM** American Society for Testing and Materials; Committee responsible for publishing specification on communication between lab instruments and lab computer systems.
- ASTM E\_1381 Protocol published by ASTM describing low-level data exchange across a serial port.
- ASTM E\_1394 Protocol published by ASTM describing the logical level formatting of patient and test data.

**EpiCenter** – Data Management System produced by Becton Dickinson that collects microbiology test results.

**LIS Interface Library** – Common module responsible for implementing communication protocols. This module is used by both the BD instruments and the EpiCenter for LIS communication.

Date/Time - All times will be represented in local time unless otherwise specified.

## 4. Overview

Becton Dickinson (BD) has released several instruments that perform automated microbiology testing. BD has also released a data management workstation that communicates with these instruments and collects test results. It is BD's intention to communicate these results up to the LIS, if one is present in the microbiology lab. The protocols and specifications for exchanging data between BD instruments and an LIS are described in this and subsequent sections.

It is Becton Dickinson's expectation that an LIS vendor will implement the specifications in this document in their entirety. The proper functioning of the EpiCenter and BD instruments is dependent on the proper exchange of information with an LIS. An agreement to support LIS communication with BD instruments should be considered an agreement to implement all aspects of this specification.

## 4.1. Physical Cable Interface

The BD instruments and data management system communicate to the LIS using an RS232 serial port interface. The serial port interface used by the instruments uses only 3 signals in the interface cable, Transmit Data (Pin 2), Receive Data (Pin 3), and Signal Ground (Pin 5). Becton Dickinson does not believe that the inclusion of additional signals will cause any problems for the interface, however Becton Dickinson has not tested this case.

## 4.2. Communication Protocols

The American Society for Testing and Materials (ASTM) has published standards for how information should be exchanged between a clinical instrument and lab computer system. BD has implemented communication software to adhere to these specifications. In system configurations that include the BD data management system, the EpiCenter plays the role of the instrument.

The ASTM committee has produced standards describing both the logical level formatting and the physical exchange of data across a serial port. The logical level formatting describes how to place individual pieces of medical information into a record string, and how to combine record strings into a properly formatted message string. The physical level protocol describes how logical level message strings can be partitioned and passed across an RS232 line to an LIS.

ASTM E\_1394 is the publication that outlines the logical formatting of medical information. This is the logical protocol BD uses to read/write data exchanged with the LIS. The ASTM E\_1394 publication should be referred to for implementation details. A later section in this document discusses any deviations from that specification.

ASTM E\_1381 is the publication that outlines the physical communication of medical information. This is the physical protocol BD uses to read/write data exchanged with the LIS. A later section in this document discusses any deviations from that specification.

## 4.3. System Configurations

The BD data management system is designed to communicate with several different types of BD instruments. The system configuration of these instruments is outlined in figure 1. New generation BD instruments have a TCP/IP network capability and use a local network to communicate to the EpiCenter. These results are then passed up to an LIS via the protocols described in this document.

Since the EpiCenter collects results from several different types of BD instruments, it passes several types of test results up to the LIS. This document specifies several different types of result records (per ASTM E\_1394) for handling all of the various types of result data.

BD also has implemented LIS interface software in each of its new generation instruments. This allows the instruments to pass results directly up to the LIS, when an EpiCenter is not present in the lab. This configuration is illustrated in figure 2. Each of the instruments sends up the results that they acquire. The types of result messages that they produce (per ASTM E\_1394) are expected to be the same as those for the EpiCenter.

Any specifications that relate only to a BD instrument are included in an appendix to this document.



## 4.4. EpiCenter- LIS Communication

The EpiCenter is designed to handle results from several different types of microbiology tests. BD instruments produce a varied set of results including growth and detection, ID, and AST results. In addition, manual off-line tests are often required to supplement the instrumented results. The EpiCenter is designed to manage these off-line test results as well as instrumented results.

The EpiCenter expects to upload test results, both instrumented and manual, to the LIS. The EpiCenter also expects to receive downloaded patient demographics and supplemental test information from the LIS. The test information that is exchanged with an LIS is configurable by the user, as is described in a later section of this document.

The EpiCenter is designed to use coded values for communicating data with an LIS. Most fields in the BD database are associated with an "LIS Code" that is configurable at the EpiCenter. This is a 20 character string that contains an LIS defined value that uniquely identifies that item. "LIS Codes" are used to represent patient demographic fields, tests, and test results in LIS communications. Later sections of this document outline the fields represented by LIS codes and how they are mapped in an LIS communication.

The most efficient way to implement this interface would be an exchange of configuration information between BD and the LIS vendor. The LIS vendor can provide BD with the LIS Codes necessary to translate message data. The list of tests and results currently defined in the EpiCenter database is included in Appendix B of this document. The EpiCenter can also import coded list information (Body site, Hospital Service, Ordering Physician, etc) The EpiCenter can accept this information as a text based comma separated value file or other similar format.

**However, most BD instruments are not able to change their LIS codes for LIS vendor convenience**. Instead they pass hard coded literal strings for test id's, test status values, etc. The literal values passed by the instruments are restricted to fields related to that instrument. These literal strings used by the instruments are outlined in later sections of this document.

## 5. Workflow

The EpiCenter has a more sophisticated workflow with regard to an LIS than any instrument. Therefore this section concentrates more heavily on EpiCenter workflow. Details about BD instrument workflow are provided in an appendix in this document.

## 5.1. Uploaded Test Results

Each test in the EpiCenter database, both manual and instrumented, has a set of results defined for that test. Each test result has a configurable field determining if that status is reportable to the LIS. This field can be set to one of three values, always report to LIS, never report to LIS and report only when finalized. When a test result is changed to a new value, the EpiCenter checks this field to determine if the result should be uploaded to the LIS. A status configured to be "Auto Upload only when finalized" is only uploaded when the user has finalized the test. By using the "Auto Upload to LIS" field, the user can tailor the LIS interface to upload only the tests and results the LIS has defined. This configuration option also allows the EpiCenter to mimic any LIS workflow defined by a particular instrument.

Test results can be forced over these upload restrictions by first enabling the LIS Forced Upload feature of the BD EpiCenter. Then initiating a manual upload of the test results via the EpiCenter user interface, or querying for the associated specimen or test will

result in the test results being uploaded to the LIS despite the upload restrictions. The EpiCenter can be configured to enable or disable unsolicited uploads from the EpiCenter. If unsolicited uploads are enabled, then when a test is assigned an uploadable status, an upload message is generated to the LIS. If the unsolicited upload option is disabled, then test status changes do not generate upload messages. Instead, the LIS has to query the EpiCenter for test information, and only those tests with an uploadable status are included in the response message. If LIS Forced Uploads is enabled at the EpiCenter, all test results matching the query will be uploaded regardless of whether their status is uploadable.

## 5.2. Uploaded Isolate Results

In an attempt to characterize an organism, a lab may run more than one ID/AST test on a particular isolate. Multiple ID/AST tests may produce conflicting results for either an organism id or antibiotic susceptibility. The EpiCenter identifies when two or more tests produce conflicting results and alerts the user that they must select the appropriate results for that isolate. Once the conflict has been resolved, the EpiCenter saves the ID and AST results for that isolate separate from the test results. On the EpiCenter, these are called Isolate Level Results.

Figure 3 depicts the basic record structures within the EpiCenter.



Figure 3

The relationships and hierarchy of the finalization scheme in the EpiCenter is depicted in Figure 4.





The EpiCenter also includes an expert system, which evaluates ID/AST results. The input to the expert system is the results from any ID/AST test. The output of the expert system may be a different isolate AST result. Any expert system changes to AST results are maintained as a separate field, but are included as part of the isolate results. So isolate results provide both the test result and the expert system result, as described in a later section.

Isolate results may be a compilation of several ID/AST results. They are also free of any conflicts. Expert system evaluations are also available with isolate level results. For these reasons, some LIS sites may find isolate level results more valuable than test level results. The EpiCenter therefore provides a mechanism for uploading isolate level results, test level results, or both.

The configuration section of the EpiCenter allows the user to set an LIS Auto Uploadable field for isolates. This field can be set to Always "Auto Upload" to LIS, "Never Auto Upload" to LIS, "Auto Upload When Specimen Finalized" or "Auto Upload When Isolate Finalized". This works in a similar way as test status results do for tests. When the isolate Auto Upload field is set to "Auto Upload When Specimen Finalized", isolate level results are only uploaded once the specimen has been finalized by the user. When the isolate Auto Upload field is set to "Auto Upload When Isolate Finalized", isolate level results are only uploaded once the isolate has been finalized by the user.

Isolate results can be forced over these upload restrictions by first enabling the LIS Forced Upload feature of the BD EpiCenter. Then initiating a manual upload of isolate results via the EpiCenter user interface, or querying for the associated specimen will result in the isolate results being uploaded to the LIS despite the upload restrictions

Isolate results are differentiated from test results as follows:

• The Test Id in Order field (O, 5, 1, 4) is set to "ISOLATE\_RESULTS" instead of a real test id.

- The first result record of an isolate result is always an ID record regardless of test types.
- Unlike test uploads which have a fixed number of results, the number of results included in an isolate can flucutuate until the isolate is finalized.
- Isolate level AST result records will contain Interpreted (R, 4, 1, 4), Expert (R, 4, 1, 5) and Final (R, 4, 1, 3) AST susceptibility values whereas test level results only contain Interpreted (R, 4, 1, 4) AST susceptibility values.
- Isolate level AST result records will contain the AST test source in field (R, 4, 1, 6).

It is possible to dictate the upload order of individual antimicrobial isolate results from the BD EpiCenter through the use of Antimicrobial Ordering feature.

## 5.3. Unsolicited Downloads

The EpiCenter accepts unsolicited download data from the LIS containing patient demographics and supplemental test information. The fields that the EpiCenter are interested in receiving are outlined in section 8 (Message Content) of this document.

Supplemental tests and results are expected to be transmitted in the same logical placement as tests and results that are uploaded. The time/date fields for test results are used to identify LIS test results more recent than EpiCenter test results. Also a test/consumable sequence number field can be used as an identifier for a test. This allows the LIS or EpiCenter to distinguish between two tests of the same type ordered against a specimen.

An LIS Test Order can also be accepted via unsolicited download without a test/consumable sequence number. In this way the LIS can order tests on specific specimens and isolates without having to format a valid BD instrumented sequence number. These orders will be automatically associated with matching tests in the EpiCenter database as they are detected. These orders can also be manually associated with orphan tests by the EpiCenter user.

The EpiCenter does not accept edits from the LIS to key fields used to identify patients and specimen. A patient ID is the key field identifying a patient. An accession number is the key field identifying a specimen. If either of these fields is received in a download message to the EpiCenter, and these values are not matched in the EpiCenter database, they are considered new entries. Re-association of a test to a new specimen, or re-association of a specimen to a new patient, must be done at the EpiCenter.

For test order and result information, the EpiCenter evaluates the time stamps associated with that data to determine which results are more current. If the LIS information is more current, than it is used to override the EpiCenter information.

For all other data downloaded from the LIS, which does not include a time stamp, the LIS data is considered correct and overrides any EpiCenter data.

Isolate level results are not accepted in a download from the LIS.

## 5.4. File Import

The EpiCenter has the ability to import LIS files containing downloaded information. The user can access a screen in the EpiCenter to manually select files to import. Import files must be text files that follow the ASTM 1394 protocol, which describes the serial line interface. The import file text is sent through the same message parser that regular serial communications go through, processing the same fields that are configured for the serial interface.

Currently the EpiCenter does not export any upload information to a file.

## 5.5. Queries

The EpiCenter is able to generate request messages (or queries) to the LIS for information. When the EpiCenter sees a new accession number, either from user entry or an instrument, the EpiCenter uploads a request message. EpiCenter request messages, (as outlined in section 8 - Message Content), are sent for only a single specimen at a time. Requests for information from the EpiCenter should be interpreted as requests for both patient demographics and supplemental test information for that specimen.

The EpiCenter can be configured to enable or disable queries sent to the LIS. If EpiCenter queries are enabled then the EpiCenter generates request messages to the LIS for information. If LIS queries are disabled, then no request messages are upload to the LIS.

The EpiCenter is also able to respond to a request generated by the LIS. The ASTM  $E_1394$  specification describes several qualifying fields that can be included in the request for a particular set of results. The qualifying fields that the EpiCenter can process are a subset of those and are outlined in section 8 (Message Content) of this document.

The fields that are included in an uploaded response message are the same fields that are included in an n unsolicited upload message.

The EpiCenter only requests information from the LIS one specimen at a time. The EpiCenter does not use many of the qualifying fields provided for in the ASTM specifications. An example of a request from the EpiCenter is provided in section 8.2.6, outlining request record fields.

## 5.6. Error Reporting

The LIS interface implemented by Becton Dickinson adheres to all of the error detection and recovery outlined in the physical level protocol. The ASTM E\_1381 protocol defines the use of check sums, time outs, etc., for the proper exchange of information. The rules described in that specification should be used to indicate whether or not data was properly sent between the LIS and the BD instruments. In the EpiCenter, any errors detected at the physical protocol level are also reported to the user and recorded in an error log.

Information transfers can also contain logical level formatting problems, or errors in message content. These logical errors may be determined after the physical receipt of the message has been acknowledged. The ASTM protocols do not describe a mechanism for reporting logical level errors. Instead any logical level errors are reported to the user by the EpiCenter. The Epicenter has an error log that contains any problems that occurred during the processing of an LIS download. It is the user's responsibility to recognize and resolve logical level problems.

## 6. Protocol Specifications

Most of the specifications needed for implementing the communication protocols are contained in the published documents referred to Overview Section of this document. The following sections contain any clarifications or deviations to those specifications.

## 6.1. Physical Protocols

The BD LIS interface implements the ASTM E\_1381 physical level protocol as outlined in the published specification except for the deviations described below.

#### 6.1.1. Memory limitations

The ASTM E\_1381 protocol does not place a limit on the total size of the message that can be received by the instrument. Since the EpiCenter is software resident on a standard PC, it does not have any significant restrictions on download message sizes. The EpiCenter expects to be able to handle any reasonably sized messages downloaded from the LIS. Should any download message exceed the maximum capacity of the EpiCenter, the message is rejected during transmission and an error notification is displayed to the user.

#### 6.1.2. Unpacked Frames

Becton Dickinson interprets the ASTM  $E_{1381}$  specification to imply that an intermediate frame of a message should be packed to be 240 characters in length. The only frame that should be less than 240 bytes in size is the last frame of a message.

However BD has had feedback from several LIS vendors who interpreted the ASTM E\_1381 specification differently. These vendors have requested that the BD LIS interface be able to send and receive frames that contain only a single logical record. (i.e. Header, Patient, Order, Result and Terminator records all are sent in separate frames). This implies that most frames are less than 240 bytes in length. However it is still possible that a single logical record could be longer than the 240 bytes limit for a frame. In this case a single logical record is sent in several consecutive intermediate frames. All but the last frame are packed to 240 bytes and the last frame containing that logical record is less than 240 bytes.

The BD LIS interface is configurable to send either packed frames or unpacked frames, which contain a single record per frame. (The BD simulator described in a later section also has this configurable option).

#### 6.1.3. BDMODEM

The BD LIS Interface can be configured to use the BDMODEM physical layer protocol. This customized protocol is been implemented by BD instrumentation already out in the field. In order to maintain backwards compatibility, the data management system supports this protocol. However, this protocol is not intended to be used for any new LIS connections. BD strongly suggests implementing the industry standard ASTM 1381 protocol for all new LIS connections. A full description of the BDMODEM protocol is provided in other BD documentation. If needed, please contact Becton Dickinson for more information.

## 6.2. Logical Protocols

The BD LIS interface implements the ASTM E\_1394 logical level protocol as outlined in the published specification except for the deviations described below.

#### 6.2.1. Unprocessed Records

The ASTM E\_1394 logical level specification describes the use of Scientific and Manufacturer records. The BD LIS interface accepts these records in a download message, however it does not evaluate the content of these record types. These records are extracted from any messages downloaded from the LIS. Messages generated by a BD LIS interface do not contain any of these records.

#### 6.2.2. Download Only Fields

The ASTM E\_1394 specification describes several fields that are divided into components, such as patient address field and patient name. For example, the address field is defined to have the street address, city, state, country, and zip code all separated by component delimiters. However these fields are saved as a single string in the EpiCenter database. The BD LIS interface reads those individual components from a download message and concatenate them for storage.

The BD LIS interface does parse these fields into their components for upload messages. If a concatenated field is selected for upload, the entire string is placed in the fist component of the field. For example, a Patient's address, including city, state and zip code, are all included in the string in the Street Address field of the Patient record. Currently the only two fields that are handled this way are Patient Name and Patient Address.

#### 6.2.3. Communication Errors

The ASTM E\_1394 protocol defines a hierarchical relationship to logical records. This protocol states that if a complete message is not successfully transmitted, then only the logical records that complete the hierarchical relationship must be resent. For example, if a message containing several patient records is not received by the instrument properly, then only the logical records from the latest Patient record on must be resent in a new message.

However the ASTM E\_1381 protocol, in section 6.5.2.3, states that if a message is not received properly, the complete message is resent. The BD LIS interface follows the specification as outlined in the ASTM E\_1381 physical level protocol. If a message is not transmitted successfully the BD LIS interface expects the whole message to be resent.

#### 6.2.4. LIS Codes

The EpiCenter uses "LIS Codes" to represent many fields in an LIS communication. "LIS Codes" are values defined by the LIS that uniquely identify a field. BD uses these codes for any information that can be configured by the user. These fields include many patient demographic fields, such as Hospital Service. "LIS Codes" are also used as test ID values, and as test status values, as described in the overview section.

"LIS Codes" are used for field values instead of full names, as described in the ASTM  $E_1394$  specification. If an LIS does not have abbreviated codes for these fields, then the "LIS Codes" can be configured to be the same as the field name text. A complete list of fields associated with an LIS code can be found in section 8 (Message Content) of this document.

Again, instruments generally do not communicate using LIS Codes. They send predefined literal strings in their ASTM messages. The strings used by the instruments when reporting their results are outlined in the instrument specific Appendices of this document.

LIS codes are NOT case sensitive.

#### 6.2.5. Blanking fields

As per the ASTM 1394 specification, the EpiCenter will accept the "" string as an indication that the value of a field should be blanked. Key fields, like Patient Id and Accession Number do not support this feature. When any coded list field in the EpiCenter, for example Hospital Service, gets blanked by the LIS, its value will change to the default value of "Unspecifed".

The EpiCenter can exchange fields with an LIS that include a list of possible values, for example Resistance Markers. When the EpiCenter receives data in a download it will replace its entire list with the list provided in the download. And in order to blank out all entries of that list, the "" string should be placed in the first field designated for that data.

## 7. Configurable Options

There are several aspects of the BD LIS interface that are configurable by the user. This allows the BD instruments to tailor their connection to the local LIS. The configurable parts of the BD LIS interface are described below.

In some cases, configuration options are specific to the EpiCenter. An appendix at the end of this document lists configuration options specific to each instrument.

#### 7.1. Port parameters

The BD LIS interface is based on serial port communication. The parameters for initializing the serial port are configurable by the user to allow for proper communication. The configurable parameters include the following fields.

Comm Port Number – acceptable values range from 1 to 4.

Baud Rate – acceptable values include 300, 600, 1200, 2400, 4800, 9600, 14400, 19200, 28800, 38400, 57600, and 115200.

Data Bits – acceptable values range from 5 to 8.

Stop Bits – acceptable values include 1 and 2.

Parity - acceptable values include ODD, EVEN, and NONE.

## 7.2. Auto-Populating Lists

The EpiCenter has a configurable option to allow new entries detected in a downloaded message to be automatically added to the BD database. If an unrecognized "LIS Code" is found in a download field, a new entry is made to the database containing that translation code. A notification is then presented to the user suggesting that they complete the proper name, and other fields, for that list entry. This is designed to provide a mechanism for initializing the EpiCenter database with all of the relevant values needed for proper LIS communication.

Antibiotics and organisms are considered coded list fields by the EpiCenter and have an LIS translation code associated with them. For antibiotics and organisms the LIS codes are defaulted to Becton Dickinson defined abbreviations. The user has the ability to modify these codes if they do not agree with codes used by the LIS, however the Organism and Antimicrobial coded lists do not support the auto-populate feature. A listing of antibiotics and corresponding BD abbreviations can be found in Appendix C. A listing of organisms and corresponding BD abbreviations can be found in Appendix D.

## 7.3. Logical Protocol Parameters

The ASTM E\_1394 protocol specifies four types of characters to be used to delimit fields in a record, (field, repeat, component and escape delimiters). The user is able to configure which characters are used as delimiter characters. These characters are defaulted to the ones used in the ASTM E\_1394 publication, '|', '\', '^', and '&' respectively.

The user is able to configure whether packed or unpacked frames are uploaded to the LIS. Unpacked frames contain a single logical record per frame.

At the EpiCenter, the user is able to configure whether or not a logical record is terminated by a CR character only, or both a CR – LF character sequence.

## 7.4. ASTM Field Mapping

There are a number of fields contained in the EpiCenter database that need to be exchanged with the LIS. BD has made an effort to properly map these fields, per the ASTM E\_1394 specification, to a field position in an appropriate record. However, some LIS vendors may interpret the meaning of these ASTM fields differently. The BD LIS interface allows the user to update the location of any field. This should allow the user to compensate for any inconsistencies between BD and LIS interfaces.

The user is able to identify each field in the BD database as an upload or download field. Fields enabled for upload messages are included in result messages passed up to the LIS. Fields enabled for download messages are parsed from any download messages from the LIS. This allows the BD LIS interface to be tailored to the specific needs of the LIS environment.

Several fields appear to be mapped into multiple locations, including test/consumable sequence number and Organism Code. These fields are mapped into the Order record because they may be needed to define a specific ordered test. These fields are also mapped into the Result record because they may be considered a result of an ID test. These fields are looked for and extracted from either location.

## 7.5. User Defined Fields

The EpiCenter contains 5 patient and 5 specimen fields that can be defined by the user. The EpiCenter makes no assumptions about what type of information is maintained in these fields. The user is able to use these fields to contain any data that the EpiCenter did account for with its other fields.

Three patient fields and three specimen fields are managed as coded list fields. These are fields whose value is one from a pre-configured list. For example the Specimen Type field can be set to a value from a determined list. The user is able to configure the entries listed in each field and define a label for that field.

Two more patient and 2 more specimen fields are free text fields that need not come from a pre-defined list of values. For example, these fields could be used for data such as a patient's Social Security Number. The user can also define a label for these fields.

Since the EpiCenter has no knowledge of the type of information being maintained in these fields, it cannot assign a meaningful default mapping in an ASTM record. These fields are mapped by default to an unused ASTM location. They are also disabled by default for both upload and download messages. The user can populate these fields and re-map them to an ASTM location agreed upon with the local LIS.

## 8. Message Content

The following sections describe which fields are exchanged with each instrument and the EpiCenter.

#### 8.1. Field List

This section lists all of the fields by name that BD instruments can exchange with the LIS. The following tables have a column for the EpiCenter fields as well as several BD instruments. The EpiCenter column indicates the fields the data management system intends to exchange. The MGIT column indicates the fields the BACTEC MGIT 960 instrument intends to exchange. The Phoenix column indicates the fields that BD's Phoenix 100 instrument intends to exchange. And the Probe column indicates the fields the BD ProbeTec ET instrument intends to exchange.

Each field is displayed with its default mapping in the ASTM E\_1394 records. This position consists of a record type (Patient, Order, Result, Query, or Comment), a field delimiter counter, repeat delimiter counter, and component delimiter counter. The fields are grouped according to the ASTM E\_1394 record type they are mapped to.

The field list also indicates if that field is defaulted as an upload (U) or download (D) field, or both (U/D). A blank column indicates that the field is not to be exchanged with an LIS. Fields not configured to be exchanged with the LIS are ignored in a download message.

The first two fields of every record include the Record Type indicator and a record index value. These fields are considered part of every record but are not listed in these tables. The following section describes these fields in more detail, including the expected values for each field.

Result records have data fields with multiple definitions, such as Result Data 1, Result Data 2, etc. The data contained in these fields depends on the type of results being reported. ID tests may have organism data in those fields, while AST tests have antibiotic data in those fields. The following sections describe in more detail what data can be expected in a result record.

Header Record Field Name	ASTM Pos.	Direction
Sender Name	H, 5, 1, 1	U
Version Number	H, 13, 1, 1	U
Message Date/Time	H 14, 1, 1	U
D D. 10' 1111		D'

Patient Record Field Name	ASTM Pos.	Direction
Patient ID	P, 4, 1, 1	U/D
Patient Name (Last)	P, 6, 1, 1	U/D
Patient Name (First)	P, 6, 1, 2	D
Patient Name (Middle)	P, 6, 1, 3	D
Patient Name (Suffix)	P, 6, 1, 4	D
Patient Name (Title)	P, 6, 1, 5	D

Patient Record Field Name	ASTM Pos.	Direction
Date of Birth	P, 8, 1, 1	U/D
Patient Sex	P, 9, 1, 1	U/D
Address (Street)	P, 11, 1, 1	U/D
Address (City)	P, 11, 1, 2	D
Address (State)	P, 11, 1, 3	D
Address (Zip Code)	P, 11, 1, 4	D
Address (Country)	P, 11, 1, 5	D
Patient Phone Number	P, 13, 1, 1	U/D
Admitting Physician	P, 14, 1, 1	U/D
Patient User Field 1	P, 15, 1, 1	
Patient User Field 2	P, 15, 2, 1	
Patient User Field 3	P, 15, 3, 1	
Patient User Field 4	P, 15, 4, 1	
Patient User Field 5	P, 15, 5, 1	
Patient Diagnosis	P, 19, 1, 1	U/D
Patient Therapy (1-5)	P, 20, 1-5,1	U/D
Admit Date/Time	P, 24, 1, 1	U/D
Room Number	P, 26, 1, 1	U/D
Hospital Service	P, 33, 1, 1	U/D
Hospital Client	P, 34, 1, 1	U/D
Order Record Field Name	ASTM Pos.	Direction
Accession Number	0, 3, 1, 1	U/D
Isolate Number	0, 3, 1, 2	U/D
Organism	0, 3, 1, 3	U/D
Exclude Isolate from Statistics	O, 3, 1, 4	U/D
Test ID	O, 5, 1, 4	U/D
Test/Consumable Sequence Number	0, 5, 1, 5	U/D
Priority	0, 6, 1, 1	U/D
Collection Date/Time	O, 8, 1, 1	U/D
Collected By	0, 11, 1, 1	U/D
Received By	0, 11, 1, 2	U/D
Specimen Action Code	0, 12, 1, 1	U
Isolate Source Test (1-3)	0, 14,1-3,1	U/D
Isolate Source Test Start Time (1-3)	0, 14,1-3,2	U/D
Receipt Date/Time	0, 15, 1, 1	U/D
Specimen Type	0, 16, 1, 1	U/D
Body Site	0, 16, 1, 2	U/D
Ordering Physician	0, 17, 1, 1	U/D
Ordering Physician Phone	0, 18, 1, 1	U
Ordering Physician Fax	0, 18, 1, 2	U
Ordering Physician Pager	0, 18, 1, 3	U
Specimen User Field 1	0, 19, 1, 1	
Specimen User Field 2	0, 19, 2, 1	
Specimen User Field 3	0, 19, 3, 1	
Specimen User Field 4	0, 19, 4, 1	
Specimen User Field 5	0, 19, 5, 1	
Finalized Date/Time*	0, 23, 1, 1	U/D
Specimen Reimbursement Value	0, 24, 1, 1	U
I est Reimbursement Value	0, 24, 2, 1	U

0, 29, 1, 1

U/D

Isolate Classification/Nosocomial

Result Record Field Name	ASTM Pos.	Direction
Result Type Code	R, 3, 1, 4	U/D
Test/Consumable Sequence Number	R, 3, 1, 5	U/D
Antibiotic	R, 3, 1, 6	U/D
Antibiotic Concentration	R, 3, 1, 7	U/D
Antibiotic Concentration Units	R, 3, 1, 8	U/D
Test Status	R, 4, 1, 1	U/D
Result Data 1		
BACTEC MGIT 960	R, 4, 1, 2	U
Growth Units		
ProbeTecET/Viper SP Alg.Results	R, 4, 1, 2	
AST MIC for AST MIC test	R, 4, 1, 2	U/D
AST Diameter for AST Dia. test	R, 4, 1, 2	U/D
Organism ID for ID test	R, 4, 1, 2	U/D
Result Data 2		
AST susceptibility (Final)	R, 4, 1, 3	U/D
Profile Number for ID Test	R, 4, 1, 3	U/D
Profile Number for Isolate ID	R, 4, 1, 3	U/D
Result Data 3		
AST susceptibility (Interpreted)	R, 4, 1, 4	U
Resistance Marker 1	R. 4. 1. 4	U
Result Data 4	7 7 7	
AST susceptibility (Expert)	R. 4. 1. 5	U
Resistance Marker 2	R. 4. 1. 5	U
Result Data 5	7 7 7 -	
AST Source test	R. 4. 1. 6	U
Resistance Marker 3	R. 4. 1. 6	U
Result Data 6	7 7 7 -	
Resistance Marker 4	R. 4. 1. 7	U
Result Data 7		
Resistance Marker 5	R, 4, 1, 8	U
Preliminary/Final Status	R, 9, 1, 1	U/D
Test Start Date/Time	R, 12, 1, 1	U/D
Result/Status Date/Time	R, 13, 1, 1	U/D
Test Complete Date/Time	R, 13, 2, 1	U
Instrument Type	R, 14, 1, 1	U
Media/Assay Type	R. 14. 1. 2	U
Protocol Length	R. 14. 1. 3	U
Instrument Number	R. 14. 1. 4	U
Instrument Location	R, 14, 1, 5	U
Additional Result Quantity (1-5)	R, 15, 1-5,1	U/D
Additional Result (1-5)	R. 15.1-5.2	U/D

Comment Record Field Name	ASTM Pos.	Direction
Comment Text	C, 4, 1, 1	U/D
Comment Type	C, 5, 1, 1	U/D

Request Record Field Name	ASTM Pos.	Direction
Request Starting Patient Id	Q, 3, 1, 1	D
Request Starting Accession Number	Q, 3, 1, 2	U/D
Request Starting Sequence Number	Q, 3, 1, 3	D
Request Ending Patient Id	Q, 4, 1, 1	D
Request Ending Accession Number	Q, 4, 1, 2	D
Request Ending Sequence Number	Q, 4, 1, 3	D
Request Test Id	Q, 5, 1, 1	D
Request Test Status	Q, 5, 1, 2	D
Request Instrument Type	Q, 5, 1, 3	D
Request Instrument Number	Q, 5, 1, 4	D
Request Result Qualifier	Q, 5, 1, 5	D
Request Time Qualifier	Q, 6, 1, 1	D
Starting Date/Time	Q, 7, 1, 1	D
Ending Date/Time	Q, 8, 1, 1	D
Request Information Status Code	Q, 13, 1, 1	U/D

Terminator Record Field Name	ASTM Pos.	Direction
Termination Code	L, 3, 1, 1	U/D

## 8.2. Field Descriptions

This section provides detailed information for each field listed in the previous section.

#### 8.2.1. Header Fields

The header records that start each logical message are the same from all BD instruments. An example record is provided below. For examples of Header records used in the context of a message, please refer to Appendix A of this document.

## H|\^&| | |Becton Dickinson| | | | | | | | V1.00|19981019184200

**Delimiter Fields** (**H**, **2**, **1**, **1**) – These single characters can be used to process the remainder of the message. These characters denote the field, repeat, component and escape delimiters as described in the ASTM E\_1394 specification. These fields are defaulted to " $|", "\rangle", "A"$ , and "&" respectively, as shown above.

**Sender Name** (H, 5, 1, 1) – Messages coming from a Becton Dickinson instrument have the BD identifier in this field as shown above.

**Version Number (H, 13, 1, 1)** – This version number represents the version of the BD LIS interface used for communications.

**Message Date/Time (H, 14, 1, 1)** – BD includes the current time and date when constructing his message, formatted as described in the ASTM E\_1394 specification in section 6.6.2.

#### 8.2.2. Patient Fields

A full patient record is shown below. The fields used in this example are referred to in the field explanations. For examples of Patient records used in the context of a message, please refer to Appendix A of this document.

P|1| |PatId123| |Doe^John^R^Jr.^Dr.| |19651029|M| |2 Main St.^Baltimore^ MD^21211^USA| |(410) 316 - 4000|JSMITH| | | | |PNEU|P\AM\AMX| | | |19981015120000| |324| | | | | | | |ER|St. Josephs Hospital

**Patient ID** (P, 4, 1, 1) - Identifier that uniquely identifies a patient. This is a required field for patient demographic downloads. This field can be up to 16 characters long. (e.g. PatId123)

**Patient Name (P, 6, 1, 1-5)** – Patient name is divided into 5 components in the ASTM  $E_1394$  specification. The BD EpiCenter stores these fields as a single string in its database. Therefore the BD LIS Interface concatenates these fields from a download message. The patient name can be up to 40 characters long. If these fields are selected for upload on the EpiCenter the whole name is placed in the first component of this field (P, 6, 1, 1). Patient name shown in the sample record is Dr. John R Doe Jr.

**Date of Birth (P, 8, 1, 1)** – Patient date of birth formatted as described in ASTM E\_1394 section 6.6.2. The date shown in the sample record is Oct. 29, 1965.

**Patient Sex**  $(\mathbf{P}, \mathbf{9}, \mathbf{1}, \mathbf{1})$  – There are 3 predefined values accepted for this field in the BD EpiCenter database, Male, Female, and Unspecified. If the value does not match the code for either Male or Female then the sex is set to Unspecified. (This is an LIS coded field for the EpiCenter).

**Patient Address (P, 11, 1, 1-5)** – The ASTM E\_1394 specification suggests that the address field be divided into 5 separate components. The EpiCenter concatenates all 5 address fields into one before saving it in the database. The patient address can be up to 255 characters long. If this field is selected for upload on the EpiCenter, the whole address is placed in the first component of this field (P, 11, 1, 1).

**Patient Phone Number (P, 13, 1, 1)** – This field is defined as a free text field that can be up to 25 characters long.

Admitting Physician (P, 14, 1, 1) – The physician admitting the patient into the hospital. In the example above "JSMITH" could be used as an LIS defined abbreviation for Dr. Jane T. Smith, who may work in the hospital. (This is an LIS coded field for the EpiCenter).

**Patient Diagnosis** (P, 19, 1, 1) – The diagnosis assigned to the patient for the current visit. In the example above "PNEU" could be used as an LIS defined abbreviation for Pneumonia. (This is an LIS coded field for the EpiCenter).

**Patient Therapy** (**P**, **20**, **1-5**, **1**) – This field contains up to 5 antibiotics that the patient may be receiving at the time the specimen is being processed. A repeat delimiter as per ASTM E\_1394 specifications separates each antibiotic. The above example indicates that the patient is currently receiving Penicillin (P), Ampicillin (AM), and Amoxicillin (AMX). (This is an LIS coded field for the EpiCenter).

Admission Date/Time (P, 24, 1, 1) – This is the time and date that the patient was admitted to the hospital. This field is formatted as specified in the ASTM E\_1394

specification, in section 6.6.2. The time portion of this field is assumed to be local time. The optional time zone is deemed unnecessary and is not evaluated.

**Room Number** (**P**, **26**, **1**, **1**) – This is a text field containing the patient's room number and can be up to 10 characters long.

**Hospital Service** (**P**, **33**, **1**, **1**) – The ward or hospital service involved in caring for this patient. (This is an LIS coded field for the EpiCenter). (e.g. ER may represent the Emergency Room).

**Hospital Client** (**P**, **34**, **1**, **1**) – This field is used by reference laboratories that accept specimens from client hospitals. (This is an LIS coded field for the EpiCenter).

**User Defined Patient Fields 1-3 (P, 15, 1-3, 1)** – In the EpiCenter, the user has the ability to configure the values for 3 coded lists related to patient fields. These fields are mapped to unused fields in the patient record by default. The user may fill these fields and remap them to a field agreed upon by the local LIS. (These are LIS coded fields for the EpiCenter).

**User Defined Patient Fields 4-5 (P, 15, 4-5, 1)** – In the EpiCenter, the user has 2 free text fields that can hold any alpha-numeric information. These fields are mapped to unused fields in the patient record by default. The user may fill these fields and remap them to a field agreed upon by the local LIS.

#### 8.2.3. Order Fields

A full order record is shown below to provide examples for the content of each field. For examples of Order records used in the context of a message, please refer to Appendix A of this document.

O|1|Acc123^1^MYCBTUB || ^ ^ MGIT\_960\_GND ^Seq123| |19981019023300| ||SJB^MMF|A| ||19981019045200 |Blood^Arm|MJones|(410) 555 - 1234^(410) 555 - 9876^(410) 555 - 7777| || ||19981020053400|62| |O| ||Nos

Accession Number (0, 3, 1, 1) – The unique alphanumeric string that identifies a specimen. This field can be up to 20 characters long. (e.g. Acc123) This is a required field for processing specimen and test information.

**Isolate Number** (0, 3, 1, 2) – The number associated with an isolate that the test should be performed on.. This field should only be used when ordering isolate based tests, otherwise this field should be left blank. Isolate numbers can range from 1 to 20.

**Organism** (0, 3, 1, 3) – The organism assigned to a particular isolate. The organism code shown in the example above, MYCBTUB, is the code for Mycobacterium tuberculosis. (This is an LIS coded field for the EpiCenter).

If an organism is indicated when ordering a BD Phoenix 100 ID/AST combo panel, then the ID portion of the panel will automatically be disabled. As a result, only the AST portion of the panel will report results.

**Exclude Isolate from Statistics**  $(\mathbf{0}, \mathbf{3}, \mathbf{1}, \mathbf{4})$  – This field will explicitly indicate if this isolate should be included or excluded from statistic reporting. If this field contains an "I", then the isolate will be included in statistical reporting. If this field contains an "E",

then the isolate will be excluded from statistical reporting. If this field is left empty, then the EpiCenter will use its internal logic to make this decision.

**Test Id** (0, 5, 1, 4) – The unique code used to represent a particular test. This is an LIS coded field for the EpiCenter. For BD instrumented tests, the test ID is the pre-defined test name provided in appendix B. (e.g. MGIT\_960\_GND)

## For isolate level results coming from the EpiCenter, this field will contain the string "ISOLATE\_RESULTS".

Test/Consumable Sequence Number (O, 5, 1, 5) – The value that identifies a test ordered. For tests originating from an instrument, this field is set with the consumable id value. For manual tests ordered at the EpiCenter, this field contains any test id entered by the user at test order time. In downloads from the LIS, this field is used to distinguish between multiple tests (of the same type) ordered against a specimen. If this field is blank, the EpiCenter assumes that this is an LIS Test Order and creates a blank test in the EpiCenter database. These orders will be automatically associated with matching tests in the EpiCenter database as they are detected. These orders can also be manually associated with orphan tests by the EpiCenter user.

This value can be up to 17 characters long.

**Priority** (**O**, **6**, **1**, **1**) – This field is defined in the ASTM E\_1394 specification. Currently only the values 'A' for Critical, 'R' for Normal and blank for default normal or no change are supported.

**Collection Date/Time** (**O**, **8**, **1**, **1**) – Date and time that the specimen was collected from the patient, formatted as described in ASTM E\_1394 section 6.6.2. The date/time shown in the sample record is 2:33 am on Oct. 19, 1998.

**Collected By** (0, 11, 1, 1) – The hospital personnel that collected the specimen from the patient. The example above shows that the specimen was collected by SJB which could be the initials for Sarah J Baker. (This is an LIS coded field for the EpiCenter).

**Received By** (0, 11, 1, 2) – The lab technician that received the specimen. The example above shows that the specimen was received by MMF, which could be the initials for Mike M Ferris. (This is an LIS coded field for the EpiCenter).

**Specimen Action Code** (**O**, **12**, **1**, **1**) – This field is defined in the ASTM  $E_{1394}$  specification. Currently only the value Q is supported, for QC tests. Normal tests leave this field blank.

**Isolate Source Test (1-3) (O, 14, 1-3, 1)** – The isolate source test is the specimen level test that produced the isolate. Often growth and detection tests are sub-cultured to produce several isolates. This field will contain test ids for up to 3 tests that yielded an isolate. This field only applies to Order records containing isolate information.

**Isolate Source Test Start Time (1-3) (O, 14, 1-3, 2)** – This is the start date and time of the isolate source test described above. It is possible that two of the same test type will be run on a specimen. This field is used to uniquely identify the isolate source test. This field only applies to Order records containing isolate information. This field is formatted as described in ASTM E\_1394 section 6.6.2.

**Receipt Date/Time (O, 15, 1, 1)** – Date and time that the specimen was received into the lab, formatted as described in ASTM E\_1394 section 6.6.2. The date/time shown in the sample record is 2:33 am on Oct. 19, 1998.

**Specimen Type (O, 16, 1, 1)** – The type of specimen collected from the patient. (This is an LIS coded field for the EpiCenter). (e.g. Blood)

**Body Site (O, 16, 1, 2)** – The body area that the specimen was taken from. (This is an LIS coded field for the EpiCenter). (e.g. Arm)

**Ordering Physician (O, 17, 1, 1)** – The physician that ordered this test. (This is an LIS coded field for the EpiCenter). (e.g. MJones could represent Mark Jones).

**Ordering Physician Phone Numbers (O, 18, 1, 1-3)** – The phone numbers that can be used to reach the ordering physician. Three numbers are accepted in this field, phone number, fax number and pager number. A component delimiter separates each phone number. These fields are free text fields that can be up to 25 characters in length.

**User Defined Specimen Fields 1-3** (**O**, **19**, **1-3**, **1**) – In the EpiCenter, the user has the ability to configure the values for 3 coded lists related to specimen fields. These fields are mapped to unused fields in the patient record by default. The user may fill these fields and remap them to a field agreed upon by the local LIS. (This is an LIS coded field for the EpiCenter).

User Defined Specimen Fields 4-5 (O, 19, 4-5, 1) – In the EpiCenter, the user has 2 free text fields that can hold any alphanumeric information. These fields are mapped to unused fields in the order record by default. The user may fill these fields and remap them to a field agreed upon by the local LIS.

**Finalized Date/Time (O, 23, 1, 1)** – The ASTM specification describes this field as containing the time the results were last modified. The EpiCenter places this information in the result record to be evaluated for each result. This field contains the date/time, formatted as described in ASTM E\_1394 section 6.6.2, that the results for this test were finalized. This field is blank if the test results are not yet finalized. The time shown in the example record is 5:34 am on Oct 20, 1998.

#### For isolate level results, this field contains the date/time the specimen was finalized.

**Specimen Reimbursement Value** (0, 24, 1, 1) – The value used for insurance reimbursement based on the specimen type. This number can be between 0 and 10,000. The value of 62 is used in the example record above.

**Test Reimbursement Value** (O, 24, 2, 1) – The value used for insurance reimbursement based on this test type. This number can be between 0 and 10,000. The example record above does not have a test reimbursement value.

**Report Type (O, 26, 1, 1)** – This field is defined in the ASTM  $E_{1394}$  specification. When a cancelled order is sent back to the LIS the report type is 'X'.

**Isolate Classification/Nosocomial (O, 29, 1, 1)** – This field contains the EpiCenter LIS code for the isolate classification. The EpiCenter has a pre-defined list of classifications for an isolate. The complete list is as follows (Significant/Nosocomial, Significant/Community Acquired, Significant/Unknown, Contaminate, Not Determined). If a downloaded code is not recognized, then the Isolate Classification is set as Significant/Unknown.

#### 8.2.4. Result Fields

The EpiCenter uploads results from several different types of tests. This causes several different types of result records to be passed to the LIS. The information contained in the generic "Data Fields" depends on the type of result being reported. AST Result records contain antibiotic and susceptibility information. ID Result records contain organism and Resistance Marker information. Growth and Detection result records contain a Positive or Negative status. Below are several different examples of result records, each one passing up a different type of result.

For AST sets, several result records may be sent to the LIS in a single message. Each result record would report the results for a single drug in the AST set. For ID/AST combo tests, an ID result record is sent as the first result record, and the AST result records follow. An example AST set result message is shown in the Appendix A of this document.

Isolate results are also exchanged using these records. Isolate results are exchanged using the same format as an ID/AST combo tests with an ID record first, then followed by several AST result records. Since isolate results are not associated with a particular test, the test code field in the Order record is replaced with the literal string "ISOLATE\_RESULT".

For examples of Results records used in the context of a message, please refer to Appendix A of this document.

BACTEC MGIT 960 growth and detection test level result example

R|1| ^ ^ GND\_MGIT^430100001234|INST\_POSITIVE ^87| | | | |P| | |19981019153400|19981020145000| MGIT960^^42^3^B/A12

BACTEC MGIT 960 AST test level result example:R|1| ^ ^ ^AST\_MGIT^439400005678^P^0.5^ug/ml| INST\_COMPLETE^105^^S| | | | |P| | |19981019153400| 19981020145000|MGIT960^42^3^ B/A12

Phoenix AST MIC test level result example:

R|1| ^ ^ ^AST\_MIC^42953000002^P| INST\_COMPLETE^0.5^^S| | | | | F| | |19981019153400| 19981020145000

 $\begin{array}{l} \mbox{Diameter based AST test level result} \\ \mbox{example:} R|1|^{^A}AST_DIA^Seq123^P^{0.5}|COMPLETE^{15} \\ \mbox{^S}|\ |\ |\ |\ |F|\ |\ |19981019153400|\ 19981020145000 \end{array}$ 

Identification test level result example:

R|1| ^ ^ ^ID^Seq123|Complete^MYCBTUB^45678^RM\_VRE| | | | |F| | |19981019153400|19981020145000

For all other tests:

R|1| ^ ^ OTHER^Seq123|Complete| | | | |F| | |19981019153400|19981020145000| |Many^GPOS\_Bac\Few^GNEG\_Rods

Isolate level result example:

R|1| ^^^AST^^P^100.0^ug/mL| ^^R^R^^MGIT\_960\_AST92| | | | |F

"Universal Test ID" ASTM E\_1394 Result field 3

**Result ID Code**  $(\mathbf{R}, \mathbf{3}, \mathbf{1}, \mathbf{4})$  – This is a BD defined code that indicates the type of information being exchanged in the result record. The interpretation of several fields may vary depending on which type of result is being passed. The possible values for this field include the following.

GND - indicates results for a generic growth and detection test.

 $\ensuremath{\textbf{GND}}\xspace \ensuremath{\textbf{MGIT}}\xspace - indicates results for a BACTEC MGIT 960 growth and detection test.$ 

GND\_PROBETEC - indicates results for a BDProbeTec ET test.

**AST** – indicates results for a generic AST test not included in the other AST categories.

**AST\_MGIT** – indicates results for a BACTEC MGIT 960 Antibiotic Susceptibility Test.

AST\_MIC – indicates results for an MIC based Antibiotic Susceptibility Test.

**AST\_DIA** – indicates results for a diameter based Antibiotic Susceptibility Test. (e.g. Kirby Bauer tests).

ID – indicates identification results.

OTHER - indicates test results not included in the above categories.

**Test/Consumable Sequence Number** ( $\mathbf{R}$ ,  $\mathbf{3}$ ,  $\mathbf{1}$ ,  $\mathbf{5}$ ) – The value that identifies the media/consumable used for generating these results. This field may be blank for manual test results where a sequence number is not known. This value can be up to 17 characters long. The example records above show the results being reported for sequence number "Seq123".

A test/consumable sequence number is required for all instrumented test results downloaded to the EpiCenter. For manual or supplemental test results downloaded to the EpiCenter this field is optional. If no sequence number is included with the results the EpiCenter searches on the current access number for any test matching the test code provided in the order record. If a match is found, the EpiCenter updates the results for that test. If no test match is found, then the EpiCenter orders a new test. Be aware that unwanted consequences could occur if more than one of a particular test type are ordered for an access number and test sequence numbers are not used.

Antibiotic ( $\mathbf{R}$ ,  $\mathbf{3}$ ,  $\mathbf{1}$ ,  $\mathbf{6}$ ) (<u>AST Results</u>) – The antibiotic tested in this AST test. The antibiotic code shown in the above AST examples is "P" for Penicillin. (This is an LIS coded field for the EpiCenter).

**Concentration (R, 3, 1, 7)** (*AST Results*) – Several AST tests, such as Kirby Bauer tests, are done with antibiotics at a specific concentration. For these tests the antibiotic concentration is needed to define the test that results are being provided for. When no concentration units are provided it is assumed to be in ug/ml. This field can be up to 15 characters long. The antibiotic concentration shown in the AST (MGIT960) example above is "0.5".

**Concentration Units (R, 3, 1, 8)** (<u>AST Results</u>) – The BACTEC MGIT 960 results include the concentration units of the concentration provided in the previous field. This field can be up 15 characters long. The concentration units shown in the AST example above is "ug/ml" for micrograms per milliliter. This is also assumed to be the default if no other value is provided.

"Data or Measurement Values" ASTM E\_1394 Result field 4

The contents of the Result Data fields vary depending on the type of test result being reported, as described below.

**Test Status**  $(\mathbf{R}, \mathbf{4}, \mathbf{1}, \mathbf{1})$  – The status value for a particular test. This field is filled for all test results. This is an LIS coded field for the EpiCenter. For BD instrumented tests, the status code is one of the pre-defined values listed in Appendix B of this document. The GND example record shown above has a test status value of INST\_POSITIVE.

#### **Result Data Field 1**

**Growth Units (R, 4, 1, 2)** (<u>BACTEC MGIT 960 Results Only</u>) – See Appendix E for instrument specific information. The Positive GND tube listed above indicates 87 growth units. The AST example record shows a growth value of 105. This field is never more than 5 characters long.

**ProbeTecET Algorithmic Result** (**R**, **4**, **1**, **2**) (<u>*BDProbeTec ET/Viper SP Result Only*</u>) – See Appendix E for instrument specific information. (future)

**Minimum Inhibitory Concentration** (**R**, **4**, **1**, **2**) (<u>*MIC based AST Result*</u>) – For AST tests that produce MIC values, this field contains the minimum antibiotic concentration that inhibits growth of the tested organism. The example above for an MIC based AST test contains an MIC value of "0.5". This field can be up to 20 characters long and is assumed to contain a number in ug/ml.

This field may contain signed MIC values such as "<=4" or ">8", MIC values for compound antimicrobials such as "0.5/4" or "<=0.5/16" as well as the following:</p>
"?" - Ongoing
"C" - Antimicrobial is Rapid Completed (*For nonQC tests in EpiCenter V4 and later*)
"X" - Error

**Diameter** ( $\mathbf{R}$ ,  $\mathbf{4}$ ,  $\mathbf{1}$ ,  $\mathbf{2}$ ) (*Diameter based AST Results*) – For Kirby Bauer type tests, this field contains the diameter of the inhibited growth region caused by the antibiotic. The diameter based AST example above shows a diameter value of 15. This number is assumed to be in millimeters.

**Organism** (**R**, 4, 1, 2) (<u>*ID Results Only*</u>) – The organism assigned to a particular isolate. The organism code shown in the example above, MYCBTUB, is the code for Mycobacterium tuberculosis. (This is an LIS coded field for the EpiCenter).

#### **Result Data Field 2**

**AST Susceptibility, Final (R, 4, 1, 3)** (*Isolate AST results only*) – This is a code that indicates is the organism is susceptible to the antibiotic specified in this record. The acceptable values for this field are **S**, **I**, **R**, **N**, and **X**, representing susceptible, intermediate, resistant, not-susceptible and error respectively. This field is only uploaded by the EpiCenter as part of an isolate level result (see earlier section). The isolate AST example record shows that the user decided to override the expert system results and say that the organism was susceptible to the antibiotic, indicated by "S" in the Final field.

**Profile Number (R, 4, 1, 3)** (*<u>ID results and Isolate ID results</u>) – This is a text field that holds the profile number associated with an ID test. This value can be up to 16 characters long. The ID result record example above indicates a profile number of 45678.* 

#### **Result Data Field 3**

AST Susceptibility, Interpreted (R, 4, 1, 4) (<u>All AST results</u>) – This is a code that indicates is the organism is susceptible to the antibiotic specified in this record. The acceptable values for this field are S, I, R, N, and X, representing susceptible, intermediate, resistant, not-susceptible and error respectively. This field contains the AST interpretation from the instrument or user before being processed by the Expert System. The isolate AST example record shows that the organism has intermediate susceptibility to the specified antibiotic, indicated by "I".

**Resistance Marker 1 (R, 4, 1, 4)** (*Isolate ID results*) – This represents a Resistance Marker associated with the organism identified in the ID result record. The EpiCenter generates this data as part of the expert system and are only included for Isolate uploads. The first Resistance Marker in the ID example above is RM\_VRE, which may be an LIS code used for Vancomycin resistant Enterococci. (This is an LIS coded field for the EpiCenter).

#### **Result Data Field 4**

**AST Susceptibility, Expert (R, 4, 1, 5)** (*Isolate AST results only*) – This is a code that indicates if the organism is susceptible to the antibiotic specified in this record. The acceptable values for this field are **S**, **I**, **R**, **N**, and **X**, representing susceptible, intermediate, resistant, not-susceptible and error respectively. This field is only uploaded by the EpiCenter as part of an isolate level result (see earlier section). The BD Phoenix instrument and the EpiCenter have an expert system that can produce a secondary evaluation of susceptibility. The isolate AST example record shows that the expert system decided that the organism is resistant to the specified antibiotic, indicated by "R".

**Resistance Marker 2 (R, 4, 1, 5)** (*Isolate ID results*) – This represents a Resistance Marker associated with the organism identified in the ID result record. The EpiCenter generates this data as part of the expert system and are only included for Isolate uploads. The example record above contains only one Resistance Marker. (This is an LIS coded field for the EpiCenter).

#### **Result Data Field 5**

**AST Source Test (R, 4, 1, 6)** (*Isolate AST results*) – This represents the Test Id for the source test that included this AST result. This is included because Isolate results may be compiled from several different AST tests. The example Isolate upload record above contains the Test Id of MGIT\_960\_AST. (This is an LIS coded field for the EpiCenter).

It is possible that there can be results on the isolate upload that have been inferred by the EpiCenter BDXpert system and are not associated with a test. When this condition occurs, EpiCenter uploads a "blank", or an empty field in the AST Source Test field(R, 4, 1, 6) as well as the MIC field(R, 4, 1, 2).

#### **Results example with AST Source Test:**

R|2|^^^AST^^CTX|^<=1^S^S^^**NMICID4** | | | | | |

#### Inferred results example without AST Source Test:

 $R|3|^{A}AST^{C}Z|^{R}R^{R}|||||F$ 

**Resistance Marker 3 (R, 4, 1, 6)** (*Isolate ID results*) – This represents a Resistance Marker associated with the organism identified in the ID result record. The EpiCenter generates this data as part of the expert system and are only included for Isolate uploads.

The example record above contains only one Resistance Marker. (This is an LIS coded field for the EpiCenter).

#### **Result Data Field 6**

**Resistance Marker 4 (R, 4, 1, 7)** (*Isolate ID results*) – This represents a Resistance Marker associated with the organism identified in the ID result record. The EpiCenter generates this data as part of the expert system and are only included for Isolate uploads. The example record above contains only one Resistance Marker. (This is an LIS coded field for the EpiCenter).

#### **Result Data Field 7**

**Resistance Marker 5 (R, 4, 1, 8)** (<u>Isolate ID results</u>) – This represents a Resistance Marker associated with the organism identified in the ID result record. The EpiCenter generates this data as part of the expert system and are only included for Isolate uploads. The example record above contains only one Resistance Marker. (This is an LIS coded field for the EpiCenter).

**Preliminary/Final Status**  $(\mathbf{R}, 9, 1, 1)$  – This field contains either a "P" or an "F" as defined in the ASTM E\_1394 specification. The result status shown in the examples above are final. *For isolate level results, this indicates the status of the isolate.* 

**Start Date/Time (R, 12, 1, 1)** – This is the date and time that the test was first started or entered into an instrument. This field is formatted as described in the ASTM E\_1394 specification in section 6.6.2. The test start time shown above is 3:34 pm on Oct 19, 1998. This field has special significance for BACTEC MGIT 960 AST tests. Please read the instrument specific section for more details.

**Result/Status Date/Time (R, 13, 1, 1)** – This is the date and time that the test received the status being reported in this record. This is a required field and is used to identify when results downloaded from the LIS are more recent than those contained in the EpiCenter. This field is formatted as described in the ASTM E\_1394 specification in section 6.6.2. The test status time shown above is 2:50 p.m. on Oct 20, 1998.

**Test Complete Date/Time (R, 13, 2, 1)** – This is the date and time that an instrumented test finished its results. This is different than the Result Date/Time in that this time will not change if the user assigns a new status to a test. For a growth and detection result record, this field will hold the Positivity Date/Time. For an ID result record, this field will hold the time that the Id portion of a BD Phoenix 100 panel completed. For an AST result from a BD Phoenix 100 panel, this field will hold the time that a valid MIC was produced. This field is formatted as described in the ASTM E\_1394 specification in section 6.6.2.

**Instrument Type (R, 14, 1, 1)** (*Instrumented Results Only*) – This field indicates which BD instrument produced the result. This field is filled with one of several BD defined values listed below. The examples above indicate that it came from a BACTEC MGIT 960 instrument.

"BT9000" – BACTEC 9000 series instrument

"MGIT960" - BACTEC MGIT 960 instrument

"PHOENIX" - BD ID/AST instrument

"PROBETEC" - BDProbeTec ET instrument

**Media Type (R, 14, 1, 2)** (*Instrumented Results Only*) – This field indicates the type of media or consumable used to perform this test. See Appendix E for instrument specific information.

**Protocol Length (R, 14, 1, 3)** <u>(Instrumented Results Only)</u> – this field indicates the length of time (in hours or days) required to complete the test. For growth and detection tests, this number represents the number of days before a tube can be considered negative. In the example above, the standard protocol for BACTEC MGIT 960 GND tests is 42 days.

**Instrument Number (R, 14, 1, 4)** (*Instrumented Results Only*) – This is the user number assigned to the instrument that ran the test. This value can be between 1 and 99.

**Instrument Location (R, 14, 1, 5)** <u>(*Instrumented Results Only*)</u> – This value indicates the position inside of the instrument where the test was performed. For BACTEC MGIT 960 tests this value indicates a drawer number, row number and well number. In the GND example above, the location B/A12 indicates that the test was performed in drawer B, row A well number 12.

**BDProbeTec ET QC Type (R, 14, 1, 6)** (*BDProbeTec ET Result Only*) – See Appendix E for instrument specific information.

**BDProbeTec ET QC Kit Lot Number (R, 14, 1, 7)** (*BDProbeTec ET Result Only*) – See Appendix E for instrument specific information.

Additional Results Quantity 1-5 (R, 15, 1-5, 1) (*EpiCenter Additional Results Only*) – This field contains a text value that associates a quantity to the additional result reported in the next ASTM component field. The quantities Many and Few are used in the example record for other tests. See the Additional Results field description for more detail. (This is an LIS coded field for the EpiCenter).

Additional Results (R, 15, 1-5, 2) (*EpiCenter Additional Results Only*) – There are several tests that can be assigned multiple results at one time. An example of such a test is a Gram Stain test, which can be assigned results such as "Gram Negative Rod Seen" AND "Gram Positive Bacillus Seen". These results differ from GnD test results of simply Positive or Negative. The EpiCenter maintains a user configurable list of additional test results that can apply to a test. Each additional result can also be associated with a quantity value, which precedes the additional result in the record. In the example above for Other tests, the additional results and quantities reported are Many GP\_BAC and Few GN\_RODS. (These are LIS coded fields for the EpiCenter).

#### 8.2.5. Comment Fields

The EpiCenter accepts and sends comment strings for patients, specimen, and isolates. Patient comments are exchanged in a comment record following a patient record, and include the patient type identifier. Specimen and isolate comments are exchanged in a comment record following the order record, and include either the specimen or isolate type identifier. An order record with both a specimen and isolate comment is shown below.

If multiple comment records are received for a patient, specimen, or isolate, then all comments of the same type are appended together and saved in the EpiCenter.

The EpiCenter can upload the description for chartable rules. This is the descriptive text for expert system rules that have been run against an isolate. The user has the ability to configure individual rules as reportable on a patient's chart report. If a rule is configured to be chartable, the rule description will be included in an upload Comment record. These comment records will follow after an Order record. Since the EpiCenter expert

system rules only apply to isolates, these types of comments will only be part of Isolate Uploads as described in section 5.2.

The following is an example of a comment record containing a rule where <310> is the rule number and (AMX, ATM, CAZ) is a list of the affected antimicrobials.

## C|1| |<310> BDXpert Rule 310 text.( AMX, ATM, CAZ )|E

Special Messages are messages that indicate a special condition for a BD Phoenix 100 panel. These will be uploaded in a Comment record as part of the test results for the panel. The following is an example of a comment record containing a special message with a list of the affected antimicrobials.

## C|1| | Special message text.(AM, CAZ)|T

Comment records not appearing after the Patient or Order records are ignored. Comments not containing the appropriate type indicator are ignored.

## O|1|Acc123^1^MYCBTUB|

C|1| |This is a specimen comment |S

C|2| |This is an isolate comment |I

**Comment Text** (C, 4, 1, 1) – The text to be used for the patient, specimen or isolate comment. This field can be up to 1600 characters long.

**Comment Type** (C, 5, 1, 1) – The type of comment record. This field should be a P, S, I, E, or T for patient, specimen, isolate, chartables rule, or special message comments respectively.

#### 8.2.6. Request Fields

The ASTM E\_1394 defines a Request record with several fields for qualifying the requested data. Data requests can be made by specifying ranges of patient IDs, accession numbers, or sequence numbers. Data requests can also be qualified by date/time ranges.

All of these fields are supported by the BD EpiCenter interface for requests originating FROM the LIS. The field mapping table on the previous pages correctly indicates the support query fields. Examples can also be found in the Sample Messages section of this document.

## Q|1|^Acc123||MGIT\_960\_GND^INST\_POSITIVE^MGIT\_960 ^2|R|19981019120000|19981020120000

The sample record shown above is evaluated to request the result information for positive MGIT\_960\_GND tests, on instrument 2, for the specimen with an accession number of Acc123 between the dates specified. Note that all query criteria are ANDed together, so that only records that meet ALL criteria will be uploaded in response to a query from the LIS.

The EpiCenter only requests information from the LIS on a per specimen basis. The request records generated by the EpiCenter contains only the accession number as a qualifying field as shown below. The EpiCenter request should be interpreted as requesting both patient demographics and all ordered tests for that specimen.

## Q|1|^Acc123| | |R

**Starting Patient ID** (Q, 3, 1, 1) – A patient ID value. This field should be filled if the data request is for either a single patient or for a range of patients. If patient ID is not to be used as a search criteria for requested data, then this field can be left blank. This field can be up to 16 characters long. In the example above, a range of patients is specified, beginning with patient ID "Pat123".

**Starting Access Number** (Q, 3, 1, 2) – A specimen ID value. This field should be filled if the data request is for either a single specimen or for a range of specimen. If accession number is not to be used as a search criterion for requested data, then this field can be left blank. This field can be up to 20 characters long. In the example above, a range of specimen is specified, beginning with Accession number "Acc123".

**Starting Sequence Number** (**Q**, **3**, **1**, **3**) – A consumable ID value. This field should be filled if the data request is for either a single test or for a range of tests. If sequence number is not to be used as a search criterion for requested data, then this field can be left blank. This field can be up to 17 characters long. In the example above, no specific sequence numbers are requested.

**Ending Patient ID** (Q, 4, 1, 1) – The patient ID that ends the alphanumeric range of ID values requested. If only data for a single patient ID is requested, then this field can be left blank. This field can be up to 16 characters long. This field contains "Pat456" in the example shown above.

Ending Accession Number (Q, 4, 1, 2) – The specimen ID that ends the alphanumeric range of ID values requested. If only data for a single accession number is requested, then this field can be left blank. This field can be up to 20 characters long. This field contains "Acc456" in the example shown above.

**Ending Sequence Number** (Q, 4, 1, 3) – The consumable ID that ends the alphanumeric range of ID values requested. If only data for a single test is requested, then this field can be left blank. This field can be up to 17 characters long. In the example above, no specific sequence numbers are requested.

**Test ID** (Q, 5, 1, 1) – This is the code used to represent a particular test, and is used to request the results for this test type. This is an LIS coded field for the EpiCenter. For BD instrumented tests, the test id is the pre-defined test name listed in appendix B.

**Test Status** (Q, 5, 1, 2) – The status for a particular test. This field is only evaluated if the Test ID field contains valid data. This is an LIS coded field for the EpiCenter. For BD instrumented tests the status value is one of the pre-defined values listed in Appendix B. The example record requests result information for XXX tests with a status of INST\_POSITIVE.

**Instrument Type (Q, 5, 1, 3)** – This field indicates the type of instrumented test requested by the LIS. The EpiCenter may be connected to several instruments of different types. This field allows the LIS to request all tests run in a particular instrument type. The appropriate values for this field are listed for the Instrument Type in the result record (R, 14, 1, 1). If the value MGIT960 is used in this field, all MGIT\_960\_GND and all MGIT\_960\_AST tests are returned.

**Instrument Number** (Q, 5, 1, 4) – This field allows the LIS to request results for a particular instrument number. This field is only evaluated if the instrument type field is also set.

**Result Qualifier** (Q, 5, 1, 5) – This field allows the LIS to request results that have been modified since the last request. The only acceptable value for this field is MOD, to indicate modified results. If this field is left blank, all results that meet the remaining criteria are included. The BD EpiCenter will not accept other criteria in a query containing the MOD result qualifier.

**Time Qualifier** (Q, 6, 1, 1) – The use of this field is described in the ASTM E\_1394 specification. The following date time fields can refer to test order times (S) or result times (R). In the example record times refer to result dates.

**EpiCenter NOTE**: If no Time Qualifier is specified, the Starting and Ending Times will, by default, refer to Result times.

**Starting Date/Time (Q, 7, 1, 1)** – The starting date/time (inclusive) of the data requested. This field is formatted as specified in ASTM E\_1394 specifications section 6.6.2. The date/time requested in example above is 12 pm on Oct 19, 1998.

**EpiCenter NOTE**: If a Starting Date/Time is specified and no Ending Date/Time is specified, data will be delivered whose Collection or Result Time is **since** the specified Starting Date/Time.

**EpiCenter NOTE**: If a Starting Date/Time specifies only the Date portion, the time will default to midnight 00:00:00.

Ending Date/Time ( $\mathbf{Q}$ ,  $\mathbf{8}$ ,  $\mathbf{1}$ ,  $\mathbf{1}$ ) – The ending date/time (inclusive) of the data requested. This field is formatted as specified in ASTM E\_1394 specifications section 6.6.2. The date/time requested in example above is 12 pm on Oct 20, 1998.

**EpiCenter NOTE**: If an Ending Date/Time specifies only the Date portion, the time will default to 23:59:59.

**Request Information Status Code** (Q, 13, 1, 1) – This field cancels an outstanding query. The only acceptable value for this field is 'A'. The EpiCenter will ignore any other Request criteria fields when they appear in the same query record as a Query Cancel command.

If the string 'ALL" appears in any Request Field, and no other Criteria are present, the EpiCenter will attempt to upload all test data in its database to the LIS.

If the string 'ALL" appears in any Request Field, and any other Criteria are present, the EpiCenter will ignore it because an empty criteria field is an implied 'ALL'.

#### 8.2.7. Terminator Fields

Below is an example terminator record.

#### L|1|N

**Termination Code (L, 3, 1, 1)** – The termination code provides an explanation of the end of session as described in the ASTM  $E_1394$  specification. The EpiCenter supporta codes of N, Q, F and I in request responses downloaded from the LIS, as described in the ASTM specifications. However the EpiCenter and all of the BD instruments upload either N, Q or F. All other codes are ignored and treated as a normal message. Normal result uploads are indicated with N and request response uploads are indicated by F. Requests that contain an error are replied to with an empty message containing the code 'Q' in the terminator record. Requests that have no data satisfying the request, are responded to with a message containing only a Header and Terminator record.

The BD interface sends the results for a single test in a message. However there may be several tests that satisfy a data request downloaded by the LIS. In this instance, the BD interface uploads all tests but the last as single tests in separate messages marked as normal uploads (N). Only the last test that satisfies the request is marked as query response (F). Once the LIS receives the query response indicator (F), it has received all of the data it requested.

## 9. Simulator

Becton Dickinson has developed a simulator for testing the physical level LIS interface. This simulator can be configured to emulate either the LIS or instrument in the ASTM E\_1381 protocol.

The simulator accepts ASTM E\_1394 message strings from a file and transmit them across the serial port interface. The simulator also receives messages across the serial port interface and save the message text into a file. A full description of the simulators specifications can be found in a separate document. Becton Dickinson intends to make the simulator and supporting document available to LIS vendors to help facilitate interface development.
#### 10. **Appendix A - Sample EpiCenter Messages**

1) BACTEC MGIT 960 GND tube ordered at the LIS for a new patient. Patient and test information is downloaded to the EpiCenter.

**H**|\^&||||||||||19981019184200 P11 |PatId123| |Doe^John^R^Jr.^Dr.| |19651029|M| |2 Main St.^Baltimore^ MD^21211^USA| (410) 316 - 4000|JSMITH| | | | | |P\AM\AMX| | | 19981015120000| 324| | | | | | |ER|St. Josephs Hospital **O**|1|Acc123^ ^ Seq123| ^ ^ MGIT 960 GND| | 19981019023300| | SJB^MMF|A| | |19981019045200 |Blood^Arm|MJones|(410)555-1234^(410)555-9876^(410)555-7777| | | | |19981020053400|62| |O| |Nos L|1|N

2) The EpiCenter can receive a new accession number from a barcode on an instrumented test. The EpiCenter requests information from the LIS about that specimen.

```
H|\^&| | |Becton Dickinson| | | | | | | | | | | | | | | 19981019184200
Q|1|^Acc123| | |R
L|1|N
```

The LIS should respond to this request with patient demographics and ordered test information. Patient Demographics may not be included if they are not yet known. The terminator record should indicate that this is a message in response to a request.

```
H|\^&||||||||||19981019184200
P|1| |PatId123
O|1|Acc123| | ^ ^ AcidFastSmear
R|1| ^ ^ GND|NO AFB| | | | | | | 19981019153400|19981020145000
O|2|Acc123^1^MYCBTUB| | ^ ^ KirbyBauer
R|1| ^ ^ AST_DIA^P^0.5^ug/ml|Complete^10^AI| || || || ||9981019153400| 19981020145000
R|3| ^ ^ AST_DIA^AMX^2.0^ug/ml|Complete^20^^S| | | | | | | |19981019153400|
   19981020145000
```

```
L|1|F
```

3) The EpiCenter can also report new instrument status values to the LIS in an unsolicited upload message.

```
H|\^&| | |Becton Dickinson| | | | | | | | V1.00 |19981019184200
P|1| |PatId123
O|1|Acc123||^^ MGIT 960 GND
R|1| ^ ^ GND^Seq456|INST_POSITIVE^87| | | | | | |
    |19981019153400|19981020145000|43^01^42^3^B/A12
O|2|Acc123| | ^ ^ MGIT 960 AST
R|1| ^ ^ AST MGIT^439400001234^P^0.5^ug/ml| INST_COMPLETE^105^S| | | | | | |
    |19981019153400| 19981020145000| MGIT960^^42^3^ B/A13
R|2| ^ ^ AST MGIT^439400001234^AMX^0.5^ug/ml| INST COMPLETE^142^A|| || || ||
    |19981019153400| 19981020145000| MGIT960^^42^3^ B/A14
R|3| ^ ^ ^AST MGIT^439400001234^AM^0.5^ug/ml| INST_COMPLETE^130^^R| | | | | | | |
    |19981019153400| 19981020145000| MGIT960 ^^42^3^ B/A15
L|1|F
```

4) The LIS can request result information from the EpiCenter.

H|\^&|||||||||||||||981019184200 Q|1|^Acc123|^Acc125|MGIT\_960\_GND^INST\_POSITIVE^MGIT\_960^2|R L|1|N

This might be a typical response message from the EpiCenter.

H|\^&||Becton Dickinson |||||||V1.00|19981019184200 P|1||PatId123 O|1|Acc123||^^^MGIT\_960\_GND R|1|^^AGND\_MGIT^430100002222|INST\_POSITIVE^87||||||| |19981019153400|19981020145000|MGIT960^42^3^B/A21 P|2||PatId456 O|1|Acc124||^^^MGIT\_960\_GND R|1|^^AGND\_MGIT^430100003333|INST\_POSITIVE^147||||||| |19981019153400|19981020145000|MGIT960^42^3^B/A22 P|3||PatId789 O|1|Acc125||^^^MGIT\_960\_GND R|1|^^AGND\_MGIT^430100005678|INST\_POSITIVE^72||||||| |19981019153400|19981020145000|MGIT960^42^3^B/A23 L|1|F

5) The EpiCenter can be configured to upload isolate level results, which may send the following data.

```
H|\^&| | |Becton Dickinson| | | | | | | | | | | | | | 1.00 |19981019184200
P|1| |PatId123
O|1|Acc123^1| | ^ ^ISOLATE_RESULT
R|1|^^ID^ENTBCLO
R|2| ^ ^AST^^P^0.5|^S^S^R|
R|3| ^ ^AST^^AMX^0.5|^I^IR|
R|4| ^ ^AST^^AMX^0.5^|^R^R^S|
L|1|F
```

6) An EpiCenter is configured with mixed instruments, Phoenix, BACTEC, and MGIT 960. All test uploads except BACTEC and MGIT 960 GND tests are disabled. Isolate uploads are configured to upload upon isolate finalization.

H|\^&|||Becton Dickinson||||||||V1.0|20050316152604 P|1||PatXYZ||Mr. Fred A. Stare O|1|Acc456^2^STACOH||^^ISOLATE RESULT|||20041104082700||||||| 20041104082750||||||||||||UNK R|1|^^ID|^STACOH^00001C71C71C71C7|||||F R|2|^^^AST^^AM|^^X^^XGPIDAST 954|||||F R|3|^^^AST^^AMC|^>16/8^X^R^XGPIDAST 954|||||F R|4|^^^AST^^CF|^>0.125^X^R^XGPIDAST 954|||||F R|5|^^^AST^^CIP|^<=2^S^S^^GPIDAST 954|||||F R|6|^^^AST^^CRO|^>1^X^X^GPIDAST 954|||||F R|7|^^^AST^^FEP|^<=4^XX^S^XGPIDAST 954|||||F

20041106090458|20050316140431\20050316140431|BT9000^93^30^C2^C30 L|1|N

20041104082700 ||||||||20041104082750 |||||||||20050316153238R|1|^^^GND^449305384011|Manual Positive|||||F|||

O|1| Acc456||^^^PLUSANF^449305384011|R||

P|1||PatXYZ||Mr. Fred A. Stare

H|\^&|||Becton Dickinson||||||||V1.0|20050316153240

The BACTEC G&D test level upload.

L|1|N

R|1|^^^GND\_MGIT^430100065177|INST\_NEGATIVE^0|||||F|||20041029112243|2004110311023 7|MGIT960^^5^1^B/C17

O|1| Acc456||^^MGIT 960 GND^430100065177|R|| 20041104082700|||||||20041104082750||||||||20050316152949

**R**|8|^^^AST^^GM|^>32^R^R^^GPIDAST 954||||||F

R|11|^^^AST^^IPM|^4^X^S^X^GPIDAST 954|||||F

**R**|15|^^^AST^^P|^>1^X^X^GPIDAST 954||||||F

RI17 AST^AST 954 **R**|18|^^^AST^^TE|^^^GPIDAST 954||||||F **R**|19|^^^AST^^TZP^0.5|^^R^R^^ASTDIA1||||||F

**R**|13|^^^AST^^MEM|^<=1^X^S^X^GPIDAST 954||||||F

**R**|16|^^^AST^^RA^1.0 ug/mL|^^I^I^^MGIT\_960\_AST94||||||F

**R**|12|^^^AST^^LVX|^^S^^S|||||F

**R**|14|^^^AST^^OFX|^^S^^S|||||F

**R**|9|^^^AST^^INH^0.10 ug/mL|^^R^R^^MGIT\_960\_AST94||||||F **R**|10|^^^AST^^INH^0.40 ug/mL|^^S^S^^MGIT\_960\_AST94||||||F

P|1||PatXYZ||Mr. Fred A. Stare

H|\^&|||Becton Dickinson||||||||V1.0|20050316152953

L|1|N

The MGIT 960 G&D test level upload.

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## 11. Appendix B – Tests and Results

The following appendix lists test names and test status values. If the LIS code for a test name or test status is different than the name, it is in parenthesis next to the name. Instrumented tests and their status values appear in **bold**. At the EpiCenter the non-instrumented tests can be reconfigured by the user. *Note: This list is not intended to be an exhaustive list, for example only some of the Test Names are listed for the Phoenix Gram Negative and Gram Positive panel types.* 

Test Type	Test Name (LIS Code)	Test Status (LIS Code)
		False Positive
	20 degree MOTE 960 CSD Eules (20MCE)	Incomplete
	SU degree MGII 900 G&D Tube (SUMGI)	Negative
		Positive
		Incomplete
	Daid East (DEC)	Acid Fast Bacilli Seen (AFB Seen)
	ACIO FASI Sillear (AFS)	No Acid Fast Bacilli Seen (No AFB
		Seen)
		Positive (INST_POSITIVE)
		Negative (INST_NEGATIVE)
	Drobowag FW Agazy (PD DBOBEWEC (ND)	Indeterminate (INST_INDETERMINATE)
	PIODEIEC EI ASSAY (BD_PROBEIEC_GND)	Equivocal (INST_EQUIVOCAL)
		QC Pass (INST_QC_PASS)
		QC Fail (INST_QC_FAIL)
	Colistin (COLIS)	
Growth and	Gram Stain (GRMSTN)	
Detection	Lowenstein-Jensen Medium (LJ)	Negative
Tests	Myco/F Lytic (MYFLTC)	POSILIVE
		Pending (Pending)
		False Positive (False Positive)
		Manual Negative (Manual Negative)
		Manual Positive (Manual Positive)
		Threshold Positive (Threshold
	MGIT 960 G&D Tube (MGIT_960_GND)	Positive)
		Negative (INST_NEGATIVE)
		Ongoing (INST_ONGOING)
		Removed Ongoing (INST_REMOVED)
		Positive (INST_POSITIVE)
		Complete (INST_COMPLETE)
		Contaminate
	Middlobrook 7411 Modium (7411)	Incomplete
	MIGGIEDIOOK /HII MEGIUM (/HII)	Negative
		Positive
	Indirect Acid Fast Smear (INDAFS)	
TD Toata	Indirect Gram Stain (INDGRMSTN)	Complete
ID lests	ProbeTec ET MAC (ETMAC)	Incomplete
	ProbeTec ET Mtb (ETMTB)	
A CUT	Ampicillin Disk (AMDISK)	
ASI -	Cephalothin Disk (CFDISK)	Complete
Toata	Gentamicin Disk (GMDISK)	Incomplete
TCDCD	Penicillin Disk (PDISK)	

Test Type	Test Name (LIS Code)	Test Status LIS Code
		Pending (Pending)
	MOTE OFO NET Corrige Sot	Manual Complete (Manual Complete)
ASI = MGII	(MGIT 960 ASI CALLEL SEC	AST Error (INST_ERROR)
900	(MG11_900_A31)	Complete (INST_COMPLETE)
		Ongoing (INST_ONGOING)
	460TB AST (460TB)	
	Ethambutol AST Test (ETHM)	
AST-MIC	Isoniazid AST Test (INH)	Complete
Tests	Pyrazinmide AST Test (PZA)	Incomplete
	Rifampin AST Test (RIF)	
	Streptomycin AST Test (STREPM)	
	NID	Complete (INST_COMPLETE)
Dheenin	NQC01	Rapid Complete (INST_RAPID_COMPLETE)
Phoenix	NMIC/ID-1	Partially Complete (INST_PARTIAL_COMPLETE)
Gram	NMIC/ID-13	In Attention Complete (INST_ATTN_COMPLETE)
Negacive	NMIC/ID-14	In Attention Ignored (INST_ATTN_IGNORED)
	NMIC/ID-15	QC Status see section 14.3.3
	PID	Complete (INST_COMPLETE)
l_ <b>.</b> .	PQC01	Rapid Complete (INST_RAPID_COMPLETE)
Phoenix	PMIC/ID-1	Partially Complete (INST PARTIAL COMPLETE)
Gram	PMIC/ID-17	In Attention Complete (INST_ATTN_COMPLETE)
Positive	PMIC/ID-18	In Attention Ignored (INST_ATTN_IGNORED)
	PMIC/ID-20	OC Status see section 14.3.3
BD Sceptor		
Panels		Complete (COMPLETE)
	Blood Agar Plate (TSA)	
	Blood Agar Plate Anaerobic (BAPANA)	
	CDC Anaerobe 5% Sheep Blood Agar	
	(CDC)	
Other	CDC Anaerobe Laked Sheep Blood Agar	Complete
Tests	with KV (KV)	Incomplete
	Cefinase (CEFINASE)	
	Choc Plate (CHOC)	]
	Indole (INDOLE)	
	MacConkey II Agar (MAC)	

# 12. Appendix C – Antibiotic Abbreviations

The following is a list of the antibiotics in the BD database, with the associated LIS Code. On the EpiCenter and BD Phoenix 100, these codes are configurable by the user. However on the MGIT and ProbeTec ET instruments these values are not configurable. Therefore a direct instrument interface sends these values as AST results.

<pre>lst gen cephalosporins w/ anti-pseudomonaCSF PilAP and gen cephalosporins w/ anti-pseudomonaCSF PilAP and gen cephalosporins grp 1 (cephamycins PP) dstiftoxacin CAM and gen cephalosporins grp 1 (cephamycins PP) dstiftoxacin CAM and gen cephalosporins grp 1 (cephamycins PP) dstiftoxacin CAM and gen cephalosporins (rst 2) (Stephamycins PP) dst gen cephalosporins (rst 2) (Stephamycins PA) dst gen cephalosporins (rst 2) (Stephamycins PP) dst gen cephalosporins (rst 2) (Stephamycins PP) dst gen cephalosporins (rst 2) (Stephamycins PP) andinocillin AMDINO_PEN Isepamicin IFP Aninocyclitols ANNCYC Kanamycin JTH Aninocyclitols ANNCYC Kanamycin JTH Aninocyclitols ANNCYC Kanamycin (rst 2) Anoxicillin/Clavulanate (rst ANC Lividomycin IV Ampicillin (rlavulanate f) AXC Lividomycin IV Ampicillin (rlavulanate f) AXC Lividomycin IV Ampicillin ANT ANT Hereins (rst 2) Apranycin APP Mecillins MC Appicillin APP Mecillins MC Approxycin APP Mecillins MC Appr</pre>	1st gen cephalosporin	CEFG1	Framycetin	SO
<pre>lat gen cephalosporins w/ anti-pseudomon2CF HLAP Fusidic Acid FA ad gen cephalosporin; grp 1 GepH ad gen cephalosporin; grp 2 (cephamyrineGRP2 Gentanicin GM ad gen cephalosporin; grp 3 GEP2 Gentanicin GM ad gen cephalosporin w/ archic GNR actiCEF_MAP dig gen cephalosporin CEFG d th gen cephalosporin CEFG d th gen cephalosporin CEFG d th gen cephalosporin M/ APD MINOPEN Inipenem IPM Aminocylicosides ANNOY Kanamycin IPM Aminocylicosides ANNOY Kanamycin V/ Aramycin V/ Aramycin V/ Archica V/ V/</pre>	1st gen cephalosporins	CEF_G1	Furazolidone	FX
2nd gen cephalosporin; grp 1 (cephanycinsGPP2 Gentiloxacin GAT And gen cephalosporin; grp 2 (cephanycinsGPP2 Gentanicin Syn GPS And gen cephalosporins arcbic GNR actiCEF MAP Givcopeptides GLYC And gen cephalosporins (cEF G2 G2 Gentanicin-Syn GMS and gen cephalosporins (cEF G3 G1ycopeptides GLYC G1 gen cephalosporins (cEF G3 G1ycopeptides GLYC G1 gen cephalosporins (CEF G4 Hydrolyzable Penicillins PEN G1 Ath gen cephalosporins (CEF G4 Hydrolyzable Penicillins PEN G1 Addinocillin AND PEN Inipenem IPM Andinocillin AND PEN Isenizid INH Andinocylitols AND (ceanycin UNIX) Andinocylitols AND (ceanycin UNIX) Andinocylitols AND (ceanycin UNIX) Andinocylitols AND (ceanycin UNIX) Anoxicillin/Clavulanate AND (ceanycin UNIX) Anoxicillin/Clavulanate ANC Linezolides Lincosamides Linco Anoxicillin/Clavulanate (f) AXC Lividoycin LV Ampicillin/Sulbactam (f) SXA Limecolides Lincosamides Lincosamides Andrey Appicillin/Sulbactam (f) SXA Limecolides Lincosamides Lincosamides Andrey Appicillin/Sulbactam (f) AXC Lividowycin UNX Ampicillin/Sulbactam (f) AXC Lividowycin UNX Appicillin/Sulbactam (f) AXC Mecrolides Lincosamides MECM Appicillin/Sulbactam (f) AXC Mecrolides Lincosam MECM Appicillin ARC MECROM Mecrolides Lincosam MECM Appicillin ARC MECROM MECROM MECROM MECROM Appicillin ARC MECROM MECROM MECROM MECROM Appicillin ARC MECROM MACON MECROM MECROM MECROM Appicillin ARC MECROM MACON MECROM MECROM MECROM Appicillin ARC MECROM MECROM MECROM MECROM MECROM	1st gen cephalosporins w/ anti-pseudomona	aCEF H1AP	Fusidic Acid	FA
2nd gen cephalosporin; grp 3     GPN3     GPN3     GPN3       2nd gen cephalosporins     CEP G2     Gentanicin -Syn     GN4       2nd gen cephalosporin w/ archic CNN act(ICEP Map     Glycopeptides     GIYCP       3rd gen cephalosporin w/ archic CNN act(ICEP Map     Glycopeptides     GIYCP       3rd gen cephalosporin w/ archic CNN act(ICEP Map     Grepafloxacin     GNX       3rd gen cephalosporin     CEP G3     High level aminoglycoside     HLAR       4th gen cephalosporin     CEP G4     High level aminoglycoside     HLAR       Aminopolicilins     AND     Isepamicin     JNN       Aminopolicilins     AND     Isepamicin     JN       Aminopolicilins     ANNCYC     Kanamycin     K       Aminopolicilins     ANNCYC     Kanamycin     Low       Aminopolicilins     ANNCYC     Kanamycin     Low       Aminopolicilins     ANNCYC     Kanamycin     LW       Aminopolicilins     ANNCYC     Kanamycin     LW       Ampicilin/Clavulanate     AX     Lincosarides     LWO       Ampicilin/Subactam     SAM     Lorestin     LOW       Aptexchin     AP     Macrolides     MAC       Aptexchin     AP     Macrolides     MAC       Aptronam     AP     Macrolides     <	2nd gen cephalosporin; grp 1	GRP1	Gatifloxacin	GAT
2nd gen cephalesporin, orb 3     GRP3     Gentamicin     GM       And gen cephalesporin w/ arcipseudomonalCEF/AP     Grycopeptides     GLYCOPEPtides     GLYCOPEPtides       Sid gen cephalesporin w/ arcipseudomonalCEF/AP     Grycaplavacin     GRX       Sid gen cephalesporin w/ arcipseudomonalCEF/AP     Grycaplavacin     GRX       Sid gen cephalesporin     CEF/G3     High level aminoglycosides     HLAR       Ath gen cephalesporin     CEF/G4     Inidazole     Inidazole     Inidazole       Ath gen cephalesporin     CEF/G4     Inidazole     Inidazole     Inidazole       Aminoplycosides     ANNUNY     Kanamycin Synergy     KS       Aminopicycosides     ANNUY     Kanamycin Synergy     KS       aminopenicillins     AN     Lincovacin     LX       Amoxicillin/Clavulante     ANC     Lincordia     LZD       Amoxicillin/Clavulante (f)     AXC     Livudomycin     LX       Appartinin     AP     Macrolides     MACC       Aprintino     AP     Mecillina     MAC       Aprintino     AP     Mecillina     MAC       Appositilin/Clavulante     AP     Mecillina     MAC       Apadellin     AM     Loracarbef     LON       Apresting     AP     Mecillina     MAC <t< td=""><td>2nd gen cephalosporin; grp 2 (cephamycin;</td><td>sGRP2</td><td>Gemifloxacin</td><td>GEM</td></t<>	2nd gen cephalosporin; grp 2 (cephamycin;	sGRP2	Gemifloxacin	GEM
2nd gen cephalosporins     CEP G2     Gentamicin-Syn     GHS       3nd gen cephalosporin w/ archic CNR actiCEF MAP     Glycopeptides     GLYCP       3nd gen cephalosporin w/ anti-pseudomonalCEF AP     Grepafloxacin     GRX       3nd gen cephalosporin     CEFG3     High level aminoglycosides     HLAR       4th gen cephalosporin     CEFG4     Hydrolyzable Penicillins     PEN       6' methoxypenicillin     MD     DEN     Imipenan     IMDA       Aminopviltols     ANN     Josanycin     JN       Aminopviltols     ANN/CYC     Kanamycin Synergy     KS       aminopenicillins     AN     Josanycin     LVX       aminopenicillins     ANK     Lincosamides     LINC       Amoxicillin/Clavulante     ANK     Lincosamides     LINC       Amoxicillin/Clavulante     ANK     Lincosamides     LON       Applicillin/Sulbactam     ANK     Lincosamides     LON       Applicillin/Sulbactam     ANK     Macrolides     Macrolides     MAC       Applicillin     APL     Macrolides     Macrolides     MAC       Aptronycin     AP     Meticillin     DP       Applicillin     APL     Macrolides     MAC       Apranycin     AP     Meticillin     DP       Applicill	2nd gen cephalosporin; grp 3	GRP3	Gentamicin	GM
3rd gen cephalosporin w/ anti-pseudomonalCEF AP       Circe         3rd gen cephalosporins       CEF G3       High level aminoquessides       HAR         4th gen cephalosporins       CEF G3       High level aminoquessides       HAR         4th gen cephalosporins       CEF G4       Inidazole       INIDA         6' methoxypenicillin       MD       Inspenem       IPM         Aminoquessides       ANUTO_PEN       Isonardid       INIDA         Aminoquessides       ANUTY       Xanamodity Correct Synergy       KS         aminopenicillins       ANUTY       Xanamodity Correct Synergy       KS         aminopenicillins       ANUTY       Xanamodity Correct Synergy       KS         aminopenicillins       ANC       Lincosamides       LINCO         Amoxicillin/Clavulanate (f)       AXC       Lincosamides       LINCO         Ampicillin/Sulbactam       SAM       Loracarbef       LOR         Apportinin       AN       Lorespeneme       MCK         Apportinin       AN       MAR       Marcarbef       LOR         Amoxicillin/Sulbactam       AN       Marcarbef       LOR         Apportinin       AR       AN       Loracarbef       MCR         Arbekacin       AR	2nd gen cephalosporins	CEF G2	Gentamicin-Svn	GMS
<pre>ind gen cephalosporin w/ anti-pseudomonalCEF AP ind gen cephalosporin ind gen cepha</pre>	3rd gen cephalosporin w/ aerobic GNR act	CEF MAP	Glycopentides	GL.VCDED
<pre>shid gen tephalosportin w/ anti-pseudonomic ter of the lawal at moglycosides with the gen cephalosportin c ter of the lawal at moglycosides with gen cephalosportin c ter of the lawal at moglycosides with gen cephalosportin c ter of the lawal at moglycosides with gen cephalosportin c ter of the lawal at moglycosides with gen cephalosportin c ter of the lawal at most with lawal at most with the lawal at most with lawal at most</pre>	3rd gen cophalosporin w/ actobic owk acco		Cropaflovagin	CDV
Fid gen (cp)minsporting       CErcia       Hydrolyzable Penicillin       Fide         figen (cp)minsporting       CErcia       Hydrolyzable Penicillin       FIDE         file       methoxypenicillin       ADD       Impenem       HITM         andinocilin       ADD       Isepanicin       IF         andinopenicillins       ANDINO_FEN       Isoniazid       IMH         Aminoplycosides       AMNCYC       Kanamycin       K         aninopenicillins       AM_PEN       Levofloxacin       IVX         aninopenicillins       AM_PEN       Levofloxacin       IVX         aninopenicillins       AMC       Lincocamides       LINCO         Anoxicillin/Clavulanate (f)       AXC       Livicoscard       LVA         Antimycobacterial drugs       APX       Macrolides       MCM         Apalcillin       ABA       Loroscard       LVA         Apalcillin       APA       Macrolides       MCM         Aplotillin       APA       Mecrolides       MCM         Apalcillin       APA       Mecrolides       MCM         Apalcillin       APA       Macrolides       MCM         Apalcillin       APA       Mecrolides       MCM <td< td=""><td>and gen cephalosporin w/ and pseudomona.</td><td>CEF_AF</td><td>Uich lough aminoplusesides</td><td>GRA</td></td<>	and gen cephalosporin w/ and pseudomona.	CEF_AF	Uich lough aminoplusesides	GRA
th gen cephalosportin     CBrU4     Hydroly2able Penicillins     FAN G       fh gen cephalosportins     CBrU4     Imidazole     IMID       f methoxypenicillin     MO     Denn     Imidazole     IMID       f methoxypenicillin     MO     Denn     Imidazole     IMID       Aminocyclitols     AMNCYC     Kananycin     Joanycin     JM       Aminocyclitols     AMNCYC     Kananycin     Lx       Aminopenicillins     JM     Levofloxacin     LX       aminopenicillins     ME     Lincosamides     LINC       Amoxicillin/Clavulanate     AMC     Lincosamides     LXD       Ampicillin/Subactam     SAM     Lorderlosacin     LOM       Applentillin/Subactam     SAA     Lymecycline     LYM       Applentillin/Subactam     APL     Macroildes Lincosam. StreptoMIS       Apramycin     APX     Methoxycin     MZS       Astromycin     AZM     Methoxycine     MZS       Astromycin     AZM     Methoxycine     MZS       Astromycin     AZM     Methoxycine     MZS   <	and gen cephalosporths	CEF_G3	High level aminoglycosides	HLAR
4In gen Cephalosporins       CEP G4       ImidaZole       IMIDAZOLE         Andinocillin       AMD       Isepamicin       ISP         Andinocillins       AMDINO_PEN       Isoniazid       INH         Amisogiocoides       AMMCLY       Esoniazid       INH         Aminopycooides       AMMCLY       Kanamycin Synergy       KS         aminopenicillins       AM PEN       Levofloxacin       LX         Amoxicillin/Clavulanate       AMC       Lincosanides       LNC         Amoxicillin/Clavulanate (f)       AX       Lincocarbef       LOM         Ampicillin/Subactam       SAM       Loracarbef       LOM         Applicillin/Subactam       APE       Mecillina       MEE         Applicillin       AP       Mecillina       MEE         Applicillin       AP       Mecillina       MEE         Applicillin       AP       Mecillina       MEE         Applicillin       AP       Mecillina       MEE         Applicillin       AZ       Methoryclina       MEM         Astromycin       AST       Methoryclina       MEM         Astromycin       AZ       Methoryclina       MZ         Astromycin       AZ       Metronid	4th gen cephalosporth	CEFG4	Hydrolyzable Penicillins	PEN_GRP
6' methoxypenicilin MD PEN Imipenem IPM andinocilin ADD Isepamicin ISP andinopenicilin ADD Isepamicin ISP andinopenicilins AND ADD Isepamicin ISP andinopenicilins AND ADD ADD ADD ADD ADD ADD ADD ADD ADD	4th gen cephalosporins	CEF_G4	lmidazole	IMIDAZ
Andinocillin     AMD     Isepanicin     ISP       andinopenicillins     AMDINO_PEN     Isoniazid     INH       Aninacyclitols     AMNCYC     Kanamycin     JM       Aninopenicillins     AMN PEN     Levofloxacin     LVX       aninopenicillins     MMCYC     Kanamycin     Special       aninopenicillins     MM PEN     Levofloxacin     LVX       aninopenicillins     MM PEN     Levofloxacin     LVX       Amoxicillin/Clavulanate     AMC     Lincosmides     LINCO       Amoxicillin/Clavulanate     AMC     Linezolid     LZ       Ampicillin/Subactam     SAM     Lymecycline     LVX       Applicillin/Subactam (f)     SXA     Lymecycline     MCRO       Aplacillin     APL     Macrolides     MACC       Apparaycin     AP     Metropenem     MEC       Appoxicillin     APX     Metropine     MC       Astronycin     AST     Metroillin     MC       Astronycin     AST     Metroillin     MC       Astronycin     AZM     Metroillin     MC       Astronycin     AZM     Metroillin     MC       Astronycin     AZM     Metroillin     MC       Astronycin     CAP     Metroillin     MC	6' methoxypenicillin	MO_PEN	Imipenem	IPM
andinopenicillins AMDINO_PEN Isoniazid INH Anikacin AN Josamycin JNH Aninocyclitols ANNCYC Kanamycin Synergy KS aninopenicillins / Education LVX Aninocycosides ANNCYC Kanamycin Synergy KS aninopenicillins / Beta-lact. Inhib. AM PEN Levofloxacin LV Anoxicillin/Clavulanate ANC Linecomides LINCO Anoxicillin/Clavulanate (f) AXC Lividomycin LV Anoxicillin/Clavulanate (f) AXC Lividomycin LV Angleillin/Subactam (f) SAM Loracarbef LOR Angleillin/Subactam (f) SAM Loracarbef LOR Angleillin/Subactam (f) SAM Loracarbef LOR Angleillin/Subactam (f) SAM Loracarbef LOR Angleillin/Subactam (f) SAM Loracarbef MC Angleillin/Subactam (f) SAM Loracarbef MC Angleillin/Subactam (f) SAM Loracarbef MC Angleillin Angleillin AM Lomefloxacin LOM Angleillin Alba AM Comefloxacin MC Angleillin Subactam (f) SAM MCCOB Macrolides MMSC Angleillin Alba AM MCCOB Macrolides MMSC Angleillin A AM MCCOB Macrolides MMSC Albekacin APK Methacyline MC Astromycin AST Methicillin DP Azithromycin AST Methicillin MC Astronom ATM Mezleillin/Subactam MSS Bacitracin B Micronomycin MC Astronom CARBACE Monolidacie MST Aslecillin MC Carbacephem CARBACE Monolidacie MST Carbacephem CARBACE Monolidacie MC Carbacephem CCR Monolidacie MC Carbacephem CCR Monolidacie MC Carbacephem CCR Monolidacie MC Carbacephem CCR Monolidacie MC Cefedinic CD Peniciliin MF Cefedinic CD CO PEN Malidaci	Amdinocillin	AMD	Isepamicin	ISP
AnikacinANJosamycinJWAninocyclitolsAMNCYCKanamycinKAninocyclitolsAMNCYCKanamycinKAninopenicillinsAMVEXKanamycinLVXaninopenicillinsMLevofloxacinLVXaninopenicillinsMLincocamidesLINCOAnoxicillin/ClavulanateAMCLincocamidesLINCOAnoxicillin/ClavulanateAMCLinezolidLDAnoxicillin/ClavulanateSALomefloxacinLOAmpicillin/SubactamSALymecyclineLTAnglicillin/SubactamAMLoracrebefLORAplicillin/SubactamAPLMacrolidesMACROApalcillinAPLMacrolidesMCCNApramycinAPMetrolinamMECAppacicillinAPZMetrolidesMCCAptenonginAPXMetholillinDPActrenonaATMMelocillin/SubactamMZSBacitracinBZMidecamycinMIDBacitracinBZMidecamycinMCNOBacitracinBZMidecamycinMIDBacitracinBZMidecamycinMCNOCarbaceptenBFMMonoactamaMCNOCarbaceptenCAMacalcamMCNOCarbaceptenCAMidecamycinMIDBacitracinCAMidecamycinMIDCarbaceptenCAMidecamycinMIDCarbaceptenCAMidecamycinMCNOCarb	amdinopenicillins	AMDINO PEN	Isoniazid	INH
AminoglycosidesAMNCYCKanamycinKaminopenicillinsAMNCLYKanamycinKsaminopenicillinsAM PENLevofloxacinLVXAmoxicillin/clavulanateAM PEN_BLILincosamidesLINCOAmoxicillin/clavulanateAMCLincosamidesLZDAmoxicillin/clavulanateAMCLividomycinLVXAmpicillin/SubactamSAMLorearbefLORAmpicillin/SubactamSAMLorearbefLORAmpicillin/SubactamAPLMacrolidesMacrolidesApplacillinAPLMacrolidesMacrolidesApalatinAPLMacrolidesMacrolidesArbekacinAPRMecillinaMEMAstromycinASTMethocylineMEMAstromycinAZMMetronidacoleMETAzlocillinAZMezlocillinMZAztromycinAZMMetronomycinMCRBenzylpenicillinBZPMidecamycinMIBiapenemBPMMonobactamsMOOXCarbeonycinCAPMoxalactamMOXCarbeonycinCAPMacillininMFCarbeonycinCAPMoxalactamMOXCarbeonycinCAPMoxalactamMOXCarbeonycinCAPMoxalactamMOXCarbeonycinCAPMoxalactamMOXCarbeonycinCAPMoxalactamMOXCarbeonycinCAPMoxalactamMOXCarbeonycinCAPMoxalactam	Amikacin	AN	Josamycin	JM
AminopolycosidesAMNOLYKanamýcin SynergyKSaminopenicillinsM PENLevofloxacinLVXaminopenicillins w/ Beta-lact. Inhib.AM PEN_BLILincomycinLAmoxicillin/ClavulanateAMCLincosamidesLINCOAmoxicillin/Clavulanate(f)AXCLividomycinLVAmpicillin/SulbactamSAMLoncarabefLORAmpicillin/SulbactamSAMLoracarbefLORApplicillin/SulbactamAPMacrolidesMACROApranycinAPMacrolidesMACROApparanycinAPLMacrolidesMCCMApparanycinAPMethicyclineMCAstpoxicillinAPXMethicyclineMCAzithromycinAZMMetronidazoleMETAzitoromycinAZMMetronidazoleMETAzitoromycinAZMMethicyclineMIDAztrenoamATMMezocillinMZSBacitracinBZPMidecamycinMIDBacitracinBZPMidecamycinMIDBacitracinCAPMoxalactamMOXDECarbencillinCCPMinocyclineMIDBacitracinCAPMicronomycinMACarbencillinCCPMinocyclineMIDCarbencillinCCPMinocyclineMIDCarbencillinCCPMinocyclineMIDCarbencillinCCPMinocyclineMIDCarbencillinCCPMinocyclineMIDCarbencillin <t< td=""><td>Aminocyclitols</td><td>AMNCYC</td><td>Kanamycin</td><td>K</td></t<>	Aminocyclitols	AMNCYC	Kanamycin	K
aminopenicillinsAM_PENLevofloxacinLVXaminopenicillinsV/ Exp.BLILincosmidesLINComycinLAmoxicillin/ClavulanateAMCLincosmidesLIZDAmoxicillin/Clavulanate (f)AXCLividomycinLVAmpicillin/SubactamSAMLorearbefLOMAmpicillin/Subactam (f)SXALymecyclineLVMAmpicillin/Subactam (f)SAALymecyclineLVMAntinycobacterial drugsAMYCOBMacrolidesMACCOApalatilinAPMecillinaMEMArbekacinARBMeropenemMEMAstromycinASTMethocillinDPAztromycinASTMethocillinMCRAstromycinAZMezlocillinMZAztromycinAZMezlocillinMZAztromycinAZMezlocillinMZAztromycinAZMezlocillinMZAztromycinCAPMoalactamMCRBenzylpenicillinBZPMidecamycinMIBiapenemCAPMoalactamMOXCarbeonycinCAPMoalactamMOXCarbeonycinCAPMoalactamMOXCarbeonycinCAPNafcillinNFCarbeonycinCAPMoalactamMOXCarbeonycinCAPMoalactamMOXCarbeonycinCAPMoalactamMOXCarbeonycinCAPNotifloxacinNFCarbeonycinCAPNotifloxacinNF	Aminoglycosides	AMNGLY	Kanamycin Synergy	KS
aminopenicillins w/ Beta-lact. Inhib. XM_PEN_BLI Lincomycin L Amoxicillin/Clavulanate AMX Lincosamides LINCO Amoxicillin/Clavulanate AMX Lincosamides LINCO Amoxicillin/Clavulanate AMX Lincosamides LINCO Amoxicillin/Clavulanate AMX Lincosamides LINCO Amoxicillin/Subbactam SAM Loracarbef LOR Ampicillin/Subbactam (f) SXA Lymecycline LYM Ampicillin/Subbactam (f) SXA Lymecycline LYM Antimycobacterial drugs AMYCOB Macrolides MACRO Apaleillin Aubactam APA Meciolides Incosam. StreptoMLS Appanycin APB Meciolian MEC Arbekacin ARB Metropenem MEM Arbekacin AAT Methocycline MET Arbekacin AAT Methocycline MET Azbekacin AAT Methocycline MET Aztheromycin BETA_LAC Minocycline MET Aztherona BETA_LAC Minocycline MID Bacitracin BZP Midecamycin MCO Carbencyline CAPP Moxialcama MOX Carbacephem CARBACEF Moxifloxactin MCD Carbencylinin CZP Moxifloxactin MCD Carbencylinin CBP Moxifloxactin MCD Carbepnems CARBACEF Moxifloxactin MCD Carbencylinins V Beta-lact. Inhib. CO PEN BLI Neowycin N Carbacephem CAR Necilin NF Carbencylinin CD PEN BLI Neowycin N Carbacephem CAR Necilin NF Carbencylinin CD PEN BLI Neowycin N Carbacephem CAR Necilin NF Carbencylinin CD PEN BLI Neowycin N Carbacoypenicillins CC CPR Noifioxacin NF Cefadroxil CCPR Non-hydrolyzable PenicillinsPEN MOR Cefadroxil CCPR Non-hydrolyzable PenicillinsPEN MOR Cefadroxil CCPR Non-hydrolyzable PenicillinsPEN MOR Cefadroxil CCPR Non-hydrolyzable PenicillinsPEN MOR Cefadroxil CDN Mystatin NF Cefadroxil CCPR Non-hydrolyzable PenicillinsPEN MA Ceffer Pivoxil CCAR Oxacilinin OX Cefepime/Subactam CPM Oxacilinin OX Cefepime/Subactam CPM Oxacilinin OX Cefepime/Subactam CPM Oxacilinin OX Cefferinox CDN Mystatin PA Cefforeracone CPP Peloxacin PAR Cefforeracone CPP Peloxacin PAR Cefforeracone CPP Penicillin G PA	aminopenicillins	AM PEN	Levofloxacin	LVX
AmoxicillinMATLincsolidesLINCOAmoxicillin/ClavulanateAMCLincsolidesLZDAmoxicillin/Clavulanate (f)AMCLividomycinLVAmpicillin/SulbactamSAMLoracarbefLOMAmpicillin/SulbactamSAMLoracarbefLOMAmpicillin/SulbactamAMYCOBMacrolidesMACCOLApaleillinAPLMacrolidesMACCOLApramycinAPLMacrolidesMACCOLArbekacinARBMeropenemMEMAspoxicillinAPXMethacyclineMCAstromycinAZMMetronidazoleMETAzithromycinAZMMetronidazoleMETAzithromycinAZMMetronidazoleMIBaciracinBMicronomycinMCRBenzylepnicillinBZPMidecamycinMICBapenemEPMMonobactamsMONOCarbacephemCARBACEFMoxilloxacinMVPCarboxypenicillins w/ Beta-lact. Inhib.CO_PENNalidikic AcidNACarboxypenicillinsCO_PENNalidikic AcidNACarboxypenicillinsCOPENNalidikic AcidNACarboxypenicillinsCOPENNalidikic AcidNACarboxypenicillinsCOPENNalidikic AcidNACarboxypenicillinsCOPENNalidikic AcidNACarboxypenicillinsCOPENNalidikic AcidNACarboxypenicillinsCOPENNalidikic AcidNACarboxypenicillins <td< td=""><td>aminopenicilling w/ Beta-lact. Inhib.</td><td>AM PEN BLT</td><td>Lincomycin</td><td>T.</td></td<>	aminopenicilling w/ Beta-lact. Inhib.	AM PEN BLT	Lincomycin	T.
Amoxicillin/Clavulanate AMC Linesolid LZD Amoxicillin/Clavulanate (f) AMC Linesolid LZD Amoxicillin/Clavulanate (f) AMC Linesolid LZD Amoxicillin/Clavulanate (f) AMC Linesolid LZD Amoxicillin/Sulbactam SAM Loracarbef LOR Ampicillin/Sulbactam (f) SXA Lymecycline LYM Amtinycobacterial drugs AMYCOB Macrolides Lincosam. StreptoMLS Apramycin AP Mccillinam MCR Appalcillin APL Macrolides Lincosam. StreptoMLS Apramycin AP Mccillinam MEC Arbekacin ARB Meropenem MEM Aspoxicillin APX Methacycline MC Astromycin AZM Metronidazole MET Azlocillin AZ Metlocillin MZ Metronidazole MET Azlocillin BZP Midecamycin MID Bacitracin BZP Midecamycin MID Beta-lactams BETA_LAC Musicocams MONOE Carbacephem CAP Moxalactam MXC Carbacephem CAP Moxalactam MXC Carbacephem CAP Moxalactam MXC Carbacephem CARBACEF Moxifloxacin MIP Carbacyphicillins V Beta-lact. Inhib. CO PEN Malidix. Acid NA Carbacyphicillins V Beta-lact. Inhib. CO PEN Malidix. Acid NA Carbacyphicillins V Beta-lact. Inhib. CO PEN Malidix. Acid NA Carbacyphicillins V Beta-lact. Inhib. CO PEN Malidix. Acid NA Carbacyphicillins V Beta-lact. Inhib. CO PEN Malidix. Acid NA Carbacyphicillins V Beta-lact. Inhib. CO PEN Malidix. Acid NA Carbacyphicillins V Beta-lact. Inhib. CO PEN Malidix. Acid NA Carbacyphicillins V Beta-lact. Inhib. CO PEN Malidix. Acid NA Carbacyphicillins V Beta-lact. Inhib. CO PEN Malidix. Acid NA Carbacyphicillins V Beta-lact. Inhib. CO PEN Malidix. Acid NA Carbacyphicillins V Beta-lact. Inhib. CO PEN Malidix. Acid NA Carbacyphicillins V Beta-lact. Inhib. CO PEN Malidix. Acid NA Carbacyphicillins V Beta-lact. Inhib. CO PEN Malidix. Acid NA Carbacyphicillins V Beta-lact. Inhib. CO PEN Malidix. Acid NA Carbacyphicillins V Beta-lact. Inhib. CO PEN Malidix. Acid NA Carbacyphicillins V Beta-lact. Inhib. CO PEN Malidix. Acid NA Carbacyphicillins V Beta CARBACEF Moxifloxacin MXF Carbacyphicillins V Beta CARBACEF Moxifloxac	Amovicillin	AMY	Lincogamides	LINCO
Amoxicilin/clavulante (f) AXC Lividomycin LD Ampicilin/Sulbactam AX Lomefloxacin LOM Ampicilin/Sulbactam (f) SAM Loreacarbef LOR Ampicilin/Sulbactam (f) SAM Loreacarbef LOR Apaloillin/Subactam (f) AXC Lividomycin LY Apapaxcillin APL Macrolides Lincosam. StreptoMLS Appranycin AP Mecillinam MEC Arbekacin ARB Meropenem MEM Aspoxicillin APX Methacycline NC Astromycin AST Methacillin DP Azithromycin AST Methacillin MZ Aztreonam ATM Mezlocillin/Subactam MZS Bacitracin BZ Methacycline MI Aztreonam ATM Mezlocillin/Subactam MZS Bacitracin BZP Midecamycin MID Beta-lactams BETA_LAC Minocycline MID Beta-lactams BETA_LAC Minocycline MID Bacarbenems CARBACEF Moxilin NFC Carbencycin CAP Moxalactam MXF Carbenems CARBACEF Moxilin NFC Carbenpencillins (CPEN Nafclin) NFC Carbenycin NFC Carbenycin CAP Moxalactam MXF Carboxypenicillins (CPEN Nafclin) NFC Carboxypenicillins (CPEN Nafclin) NFC Carboxypenicin (CPEN Nafclin) NFC Carboxypenicillins (CPEN N	Amoxicillin (Claudanato	AMC	Linogolid	LINCO
AMOXIOIIIM/CLAVUIANCE (1) ARC LIVIAGCIN LV Ampicillin/Sulbactam SAM Loracarbef LOR Ampicillin/Sulbactam (f) SXA Lymecycline LYM Antimycobacterial drugs AMYCOB Macrolides Lincosam. StreptoMLS Apramycin AP Mecillinam MEC Arbekacin ARB Meropenem MEM Aspoxicillin APX Methacyline MC Astromycin ARB Meropenem MEM Aspoxicillin APX Methacyline MC Astromycin ARB Meropenem MEM Aspoxicillin APX Methacyline MC Azthornycin AZM Metronidazole MET Azlocillin BZP Midcanycin MCR Benzylpenicillin BZP Midcamycin MCR Benzylpenicillin BZP Midcamycin MCR Benzylpenicillin BZP Midcamycin MID Beta-lactams BETA_LAC Minocycline MI Biapenem DPM Monbactams MONOE. Carbacephem CARBACEF Moxifloxacin MXF Carbencein CARBACEF Moxifloxacin MXF Carbacphems CARBACEF Moxifloxacin MIF Carbacphems CARBACEF Moxifloxacin MIF Carbacphems CARBACEF Moxifloxacin MIF Carbacphem CARBACEF Moxifloxacin MIF Carbacphem CARBACEF Moxifloxacin MIF Carbacphems CARBACEF Moxifloxacin MIF Carbacphems CARBACEF Moxifloxacin MIF Carbacphems CARBACEF Moxifloxacin MIF Carbacypenicillins V Beta-lact. Inhib. CO PEN Nalidixic Acid NA Carbacypenicillins CCR Netilmicin NFF Cefadroxil CFR Nifuroazide NFX Cefadroxil CFR Nifuroazide NFX Cefadroxil CFR Nifuroazide NFX Cefadroxil CCR Norobiacin NB Cefditoren CDN Novobiacin NB Cefditoren VCN CX p-Aminosalicylic acid PAS Cefemenxime CMX Oxolinic Acid CA Cefemenxime CMX Oxolinic Acid CA Cefemenxime CMX Oxolinic Acid CA Cefemenxime CMX Oxolinic Acid CA Cefemenxime CMX Oxolinic Acid AC Cefemenxime CMX Oxolinic Acid CA Cefemenxime CMX Oxolinic Acid PAS	Amoxicillin/Clavulanate (f)	AMC	Linezolia	
AmpicillinAMLomeIcNaclinLOMAmpicillin/SulbactamSAMLoracarbefLORAntimycobacterial drugsAMYCOBMacrolidesMACROApalacillinAPLMacrolidesMacrolAppranycinAPMecillinamMECArbekacinARBMeropenemMEMAspoxicillinAPXMethacyclineMCAstromycinAPMetillinamMETAstromycinAZMetronidacoleMETAzilhromycinAZMMetronidacoleMETAziltromycinAZMezlocillinMZSAztocillinBZMicronomycinMCRBenzylpenicillinBZPMidecamycinMIDBeta-lactamsBETA_LACMinocyclineMIBiapenemCAPMoxalactamMOXCarbeephemCAPMoxalactamMOXCarbeopenemsCARBACEFMoxilicacinMYDCarboxypenicillinsV Geta-lact. Inhib.CO_PENNalidixic AcidCardunnamaCARNitrofurantoinNTCefaalorCDCNifurzideNZDCefadorinCDNNytatinNTCefadorinCDNNytatinNTCefadorinCDNNytatinNTCefadorinCDNNytatinNTCefadorinCDNNytatinNTCarboxypenicillinsCO_PENNifurzideNZDCefadorinCCPNifurzideNZDCefadorinCCRNifurzi	Amoxicillin/Clavulanate (I)	AXC	Lividomycin	LV
Ampicillin/SulbactamSAMLoracrbefLORAmpicillin/Sulbactam (f)SXALymecyclineLYMAntimycobacterial drugsAMYCOBMacrolidesMACROApalcillinAPLMacrolidesMACROApramycinAPMecillinamMECArbekacinAPBMeropenemMEMAspoxicillinAPXMethacyclineMCAstromycinAZMMethacyclineMCAzithromycinAZMMethacyclineMETAztreonamATMMelocillin/SulbactamMZSBacitracinBMicromycinMCBenzylpenicillinBZPMidecamycinMIDBeta-lactamsBETA_LACMinobactamsMONOB.CarbacephemCARBACEFMoxifloxacinMXFCarbacephemCARBACEFMoxifloxacinMIPCarbacephemCARBACEFMoxifloxacinMIPCarbacephemCARBACEFNafilinNFCarboxypenicillinsVCo_PENNalidixic AcidNACardannamaCO_PENNalidixic AcidNACardannamaCZCNifurzideNZDCefalorCDPENNifurzideNZDCefalorCDCDNNystatinNTCefalorCDNNydrolyzable Penicillins/FENMORCefdinirCDNONNystatinNTCefalorCDNNystatinNTCefalorCDNNystatinNTCefdinirCDNOxacin<	Ampicillin	AM	Lomefloxacin	LOM
Ampicillin/Sulbactam (f)SXALymecyclineLYMAntimycobacterial drugsAMYCOBMacrolidesMACROApalcillinAPLMacrolidesLicosam. StreptoMLSApramycinAPMecillinamMECArbekacinARBMeropenemMEMAspramycinAPXMethacyclineMCAstromycinAZMMethcicillinDPAzichilinAZMezlocillin/SulbactamMZAzlocillinAZMezlocillin/SulbactamMZSBacitracinBMicronomycinMCRBenzylpenicillinBZPMideamycinMIDBeta-lactamsBETA_LACMinocyclineMIBiapenemBPMMonobactamsMONDECarbacephemCARBACEFMoxifloxacinMXFCarbacephemCARBACEFMoxifloxacinNKFCarbocypenicillinsCO_PENNalicikic AcidNACarboxypenicillinsCO_PEN BLINeomycinNCardacophemCZRNifuroazideNFXCefadroxilCFRNifuroazideNFXCefadroxilCDRNordrolyzable PenicillinsPENNORCefadroxilCDRNordrolyzable PenicillinsPENNORCefditorenCDNNystatinNYCefadroxilCDRNordrolyzable PenicillinsPENNGRCefedinirCDNNystatinNYCefedinirCDNNystatinNYCefeimeFPPOlandeomycinCICefeenet-pivoxil <td>Ampicillin/Sulbactam</td> <td>SAM</td> <td>Loracarbef</td> <td>LOR</td>	Ampicillin/Sulbactam	SAM	Loracarbef	LOR
Antimycobacterial drugsAMYCOBMacrolidesMACROLApalcillinAPLMacrolides Lincosam. StreptoMLSApramycinAPMecillinamMECArbekacinARBMeropenemMEMAspoxicillinAPXMethacyclineMCAstromycinAZMMetronidazoleMETAzithromycinAZMMetronidazoleMETAztreonamATMMezlocillin/SulbactamMZSBacitracinBMicronomycinMIDBenzylpenicillinBZPMidecamycinMIDBeta-lactamsBETA_LACMinocyclineMIBiapenemCARBACEFMonobactamsMONOB.CarbacephemCARBACEFMoxifloxacinMXFCarbacephemCARBACEFMacinici AcidNACarboxypenicillinsCO_PEN_BLINerNerCardacaphenCECNifurzideNZDCardacaphenCECNifurzideNZDCardacaphenCECNifurzideNZDCardacaphenCECNifurzideNZDCardacaphenCECNifurzideNZDCafalorCECNifurzideNZDCefalorCDNNystatinNYCefalorCDNNystatinNYCefalorCDNNystatinNYCarboxypenicillinsCDNNystatinNYCefalorCECNifurzideNZDCefalorCECNifurzideNZDCefalorCDNNystatinNY<	Ampicillin/Sulbactam (f)	SXA	Lymecycline	LYM
ApaleillinAPLMacrolides Lincosam. StreptoMLSApramycinAPMecillinamMECArbekacinARBMercollinamMECAspoxicillinAPXMethacyclineMCAstromycinASTMethicillinDPAzithromycinAZMMetronidazoleMETAzlocillinAZMezlocillin/SublactamMZSBacitracinBMicronomycinMCRBenzylpenicillinBZPMidecamycinMIDBeta-lactamsBETA_LACMinocyclineMIBiapenemBPMMonobactamsMONECarbacephemCARBACEFMoxifloxacinMXFCarbocypencillinsCO_PENNalidixic AcidNACarboxypenicillinsCO_PENNalidixic AcidNACarboxypenicillinsCARBAPENNafcultanicNFXCefadroxilCFRNifuroazideNFXCefadroxilCFRNifuroazideNFXCefadroxilCDRNorfloxacinNFXCefadroxilCFRNifuroazideNFXCefadroxilCFRNifuroazideNFXCefadroxilCDRNorfloxacinNGRCefdirerCDNNystatinNYCefdirerCDNNystatinNYCefadroxilCFFNitroxacinNGRCarboxypenicillinsCONGRNGRCefedinirCCRNitroxacinNGRCefadroxilCFRNitroxacinNGRCefadroxilCFR <td< td=""><td>Antimycobacterial drugs</td><td>AMYCOB</td><td>Macrolides</td><td>MACRO</td></td<>	Antimycobacterial drugs	AMYCOB	Macrolides	MACRO
ApramycinAPMecillinamMECArbekacinARBMeropenemMEMAspoxicillinAPXMethacyclineMCAstoromycinASTMethicillinDPAzithromycinAZMMetronidazoleMETAzithromycinAZMMetronidazoleMETAztreonamATMMezlocillin/SulbactamMZSBacitracinBMicronomycinMIDBenzylpenicillinBZPMidecamycinMIDBeta-lactamsBETA_LACMinocyclineMIBiapenemCAPMoxalactamMOXOCarbencillinCBMujirocinMUPCarbencillinCBMujirocinMUPCarbencillinsCO_PENNalidixic AcidNACarboxypenicillins w/ Beta-lact. Inhib.CO_PEN_BLINeomycinNETCefadroxilCFRNifuroazideNFXMethocyclineNTCefadroxilCFRNifuroazideNFXMethocyclineNTCefadroxilCFRNorloyzable Penicillins/PEN_MNGCCefatizineCFBNorfloxacinNDNGCefditorenCDNNystatinNYCefditorenCDNNystatinNYCefditorenCDNNystatinNYCefditorenCDNNystatinNYCefditorenCDNNystatinNYCefditorenCMZCoxytetracyclineTCefepime/SulbactamSFPOrldazoleOTHERCefeinine	Apalcillin	APL	Macrolides Lincosam. Strepto	MLS
ArbekacinARBMeropenemMEMAspoxicillinAPXMethacyclineMCAstromycinASTMethicillinDPAzlocillinAZMMetronidazoleMETAzlocillinAZMezlocillin/SulbactamMZSBacitracinBMicronomycinMCRBenzylpenicillinBZPMidecamycinMIDBetaracinBMicronomycinMCRBiapenemBPMMonobactamsMONCBCarbacephemCAPMoxalactamMOXCarbacephemCARBACEFMoxifloxacinMIFCarbocephemCARBACEFMoxifloxacinNFCarbocaphenCBMupirocinNUPCarbocaphenCARBACEFNatificial onNFCarborypenicillinsCO_PENNalidixic AcidNACarduandamCENifuroazideNFXCefaclorCPRNifuroazideNFXCefadroxilCFRNifuroazideNFXCefatrizineFATNitroxolineNITCefatrizineCPBNorloxacinNGRCefditorenCDNNystatinNYCefditoren pivoxilCDNOrloxacinOFXCefeime/SulbactamSFPOrnidazoleQRNCefeimeCFPOlandeomycinOLCefeimeCFPOlandeomycinOLCefeimeCFPOlandeomycinOLCefeimeCFPOlandeomycinQRCefeimeCDNOxaciniOA <td>Apramycin</td> <td>AP</td> <td>Mecillinam</td> <td>MEC</td>	Apramycin	AP	Mecillinam	MEC
AspoxicillinAPXMethacyclineMCAstromycinASTMethacyclineDPAzithromycinAZMMetronidazoleMETAzlocillinAZMezlocillinMZAztronamATMMezlocillin/SublactamMZSBacitracinBMiconomycinMCRBenzylpenicillinBZPMidecamycinMIDBeta-lactamsBETA_LACMinocyclineMIBiapenemCAPMoxalactamMONDECapreomycinCAPMoxalactamMXFCarbencillinCBMupirocinMIPCarbencillinCBMupirocinMIFCarbencillinsCO PENNalidixic AcidNAcarboxypenicillinsCO PENNalidixic AcidNAcarboxypenicillinsCFRNifurzideNZDCefadroxilCFRNifurzideNZDCefatrizineFATNitroxolineNITCefatrizineCPRNorloxacinNORCefditorenCDNNystainNPCefditorenCDNNystainNPCefditorenCDNNystainNPCefeime/SublactamSFPOrnidazoleORCefeimeCTMOxacillinOXCefeimeCTMOxacillinOXCefeimeCDNNystainNPCefeitimeCDNNystainNPCefeitineCDNNystainNPCefeitineCDNNystainNPCefeitine <td< td=""><td>Arbekacin</td><td>ARB</td><td>Meropenem</td><td>MEM</td></td<>	Arbekacin	ARB	Meropenem	MEM
AstromycinAstroMethicillinDPAstromycinAZMMethicillinDPAzlocillinAZMMetronidazoleMETAzlocillinAZMezlocillin/SulbactamMZSBacitracinBMicronomycinMIDBeta-lactamsBZPMidecamycinMIDBeta-lactamsBPMMonobactamsMONCCarbacephemCAPMoxiloxacinMXFCarbacephemCAPMoxiloxacinMVPCarbacephemCARBACEFMoxilixic AcidNACarbonypenicillinsCO_PENNalidixic AcidNAcarboxypenicillinsCO_PENNalidixic AcidNAcarboxypenicillins w/ Beta-lact. Inhib.CO_PENNalidixic AcidNAcardunonamCARNetilmicinNFXCefadorCECNifuroazideNFXCefadorilCFRNifuroazideNFXCefadroxilCFRNifuroazideNFXCefatrizineFATNitroxolineNITCefatirinCDNMystatinNYCefditorenCDNMystatinORCefepime/SulbactamSFPOrnidazoleORCefeimeFEPOlandeomycinOLCefeimeCFMOxacillinOXCefemenximeCNXp-Aminosalicylic acidPACefonicidCDNPanemenPACefonicidCDNPanemenPACefonicidCDNPanemenPACefonicidCDN <td>Aspoxicillin</td> <td>APX</td> <td>Methacycline</td> <td>MC</td>	Aspoxicillin	APX	Methacycline	MC
Azithromycin AZM Metronidazole MET Azichromycin AZM Metronidazole MET Aztreonam ATM Mezlocillin/Sulbactam MZS Bacitracin B Micronomycin MCR Benzylpenicillin BZP Midecamycin MID Beta-lactams BETA_LAC Minocycline MI Biapenem BPM Monobactams MONOE Capreomycin CAP Moxalactam MOX Carbacephem CARBACEF Moxifloxacin MXF Carbenicillin CB Mupirocin MUP Carbenems CARBAPEN Nafcillin NF carboxypenicillins w/ Beta-lact. Inhib. CO PEN Nalidixic Acid NA carboxypenicillins w/ Beta-lact. Inhib. CO PEN Nalidixic Acid NA Carbacaphem CARBAPEN Nafcillin NF Carumonam CAR Nitrofurantoin MUP Cardenycin CARBAPEN Nafcillin NF Carboxypenicillins w/ Beta-lact. Inhib. CO PEN Nalidixic Acid NA Carboxypenicillins w/ Beta-lact. Inhib. CO FEN Nalidixic Acid NA Carboxypenicillins w/ Beta-lact. Inhib. CO PEN Nalidixic Acid NFX Cefadroxil CFR Nifurozide NFX Cefadroxil CFR Nifurozide NFX Cefadroxil CFR Nifurozide NFX Cefatrizine FAT Nitroxoline NIT Cefazolin CZ Non-hydrolyzable PenicillinsPEN M Cefduren CDR Novobiocin NB Cefditoren CDN Nystatin NY Cefditoren Piroxil CDN Nystatin NY Cefditoren SFP Ornidazole ORN Cefepime SPP Ornidazole ORN Cefepime CFM Oxacillin OX Cefepime CFM Oxacillin OX Ceferenzone CFP Peniconsolicylic acid PAS Cefonicid CID Paromorycin PAR Cefonicid CID Paromorycin PAR Ceforenzone/Sulbactam SCP Penamycin PENAM Ceforenzone/Sulbactam SCP Penamycin PENAM Ceforenzone CTX Penicillin V PV	Astromycin	AST	Methicillin	DP
Azlocillin AZ Meclocillin MZ Azlocillin AZ Meclocillin MZ Aztreonam ATM Meclocillin MZ Aztreonam ATM Meclocillin/Sulbactam MZS Bacitracin B Micronomycin MCR Benzylpenicillin BZP Midecamycin MID Beta-lactams BETA_LAC Minocycline MI Biapenem BPM Monobactams MONOE Carbacephem CARBACEF Moxifloxacin MXF Carbacephem CARBACEF Moxifloxacin MXF Carbenenems CARBAPEN Nafcillin NF Carboxypenicillins CO PEN Nalidixic Acid NA carboxypenicillins W Beta-lact. Inhib. CO PEN Nalidixic Acid NA Carumonam CAR Netimicin NET Cefaclor CEC Nifuroazide NFX Cefadroxil CFR Nifuroazide NFX Cefadroxil CFR Nifuroazide NFX Cefadroxil CFR Nifuroazide NFX Cefatrizine FAT Nitroxoline NIT Cefacloin CZ Non-hydrolyzable PenicillinsPEN M Cefdinir CDN Nystatin NF Cefdinir CDN Nystatin NF Cefdinir CDN Nystatin NF Cefetamet-pivoxil CDN Nystatin OC Cefepime CFP Ornidazole ORN Cefetamet-pivoxil CAT Others OTHER Cefetamet PFP Ornidazole ORN Cefetamet CFM Oxacin OFM Cefetamet CDN Nystatin NF Cefetamet PFP Ornidazole ORN Cefetamet CDN Nystatin NF Cefetamet-pivoxil CDN Nystatin NF Cefetamet CFM Oxacilin OFX Cefepime CFM Oxacilin OFX Cefepine CFM Oxacilin OFX Cefepine CFM Oxacilin OFX Cefepine CFM Oxacilin OFX Cefefine CFM Oxacilin PEN Ceforicid CID Paromonycin PAN Cefooricid CID Paromonycin PAN Cefooricid CID Paromonycin PAN Cefooricid CID Penamycin PEN	Agithromygin	7 7 M	Metropidagolo	MET
AztreonamAZMeziocillin/SulbactamMZBacitracinBMicronomycinMZBenzylpenicillinBZPMidecamycinMIDBeta-lactamsBPMMonobactamsMONOECapreomycinCAPMoxlactamMOXCarbencicillinCBMujrocinMUPCarbencicillinCBMujrocinMUPCarbencicillinsCARBACEFMoxifloxacinNFCarboxpenicillinsCOPENNafcillinNFCarboxpenicillinsCOCPENNalidixic AcidNACarboxpenicillinsCOCECNifuroazideNFXCefaclorCECNifuroazideNFXCefadroxilNETCefadroxilCFRNifuroazideNFXCefatorinNGRCefatorinCZNon-hydrolyzable PenicillinsPENNITCefatorinNGRCefditorenCDNNystatinNYCefditorenNGRCefditorenCDNNystatinNYCefeppimeCFFOrnidazoleORNCefepime/SulbactamSFPOrnidazoleORCefeppimeCHECARCarboxicinOFXCefepime/SulbactamCFMOxacillinOXCefemetazoleCTChersCARCefemetazoleCARCefinincCDNOrbidazoleCFNOrbidazoleCFNCefemetazoleCARCARCefinincCDNNystatinOXCefemetazoleCARCoxiliniCFNCefemetazoleCAR </td <td>Azionilin</td> <td>AZM</td> <td>Merlogillin</td> <td>MT</td>	Azionilin	AZM	Merlogillin	MT
AztronamArmMeziotinin/SundatamMasBacitracinBMicronomycinMCRBenzylpenicillinBZPMidecamycinMIDBeta-lactamsBETA_LACMinocyclineMIBiapenemBPMMonobactamsMONDECarbacephemCARBACEFMoxifloxacinMXFCarbacephemCARBACEFMoxifloxacinMXFCarbonicillinCBMupirocinMUPCarboxypenicillinsCO_PENNalidixic AcidNAcarboxypenicillinsCO_PEN_BLINeomycinNETCefadroxilCFRNifurzideNFXCefadroxilCFRNifurzideNITCefadroxilCZNonchioreNITCefadroxilCZNonchioreNITCefadroxilCZNonchioreNITCefadroxilCZNonchioreNITCefadroxilCZNonchioreNITCefadroxilCZNonchioreNITCefadroxilCZNonchioreNITCefadroxilCZNonchioreNITCefadroxilCDNNystatinNYCefditorenCDNpOfloxacinOFXCefeimeFEPOnladeomycinOLCefeimeCFMOxacillinOXCefeimeCFMOxacillinOXCefainerCDNpOfloxacinOFXCefeinerCFMOxacillinOXCefeinesCFMOxacillinOXCefeinesCF	Aziociiii		Mezlocillin (Culbactor	MZC
Bacitracin BZP Micronomycin MCK Benzylpenicillin BZP Micronomycin MID Beta-lactams BETA_LAC Minocycline MI Biapenem BPM Monobactams MONOE Carbeorycin CAP Moxalactam MXF Carbeneycin CAP Moxilactam MXF Carbeneyenm CARBACEF Moxifloxacin MXF Carboxpenicillin CB Mupirocin MUP Carboxypenicillins V Beta-lact. Inhib. CO_PEN Nalidixic Acid NA carboxypenicillins w/ Beta-lact. Inhib. CO_PEN Nalidixic Acid NA Carumonam CAR Netilmicin NFT Cefaclor CEC Nifuroazide NFX Cefadroxil CFR Nifurzide NZD Cefamandole MA Nitrofurantoin FM Cefatrizine FAT Nitroxoline NIT Cefacoln CZ Non-hydrolyzable PenicillinsPEN_M Cefditoren Divoxil CDN Nystatin NY Cefditoren Divoxil CDN Nystatin NY Cefditoren Pivoxil CDN Nystatin NY Cefepime FEP Olandeomycin OL Cefepime/Sulbactam SFP Ornidazole ORN Cefeinman CMX Oxolinic Acid OA Cefemenxime CFM Oxacillin OX Cefeonexime CFM Oxacillin OX Cefeonexime CFP Penexime T Cefatarizin NY Cefeinme CDN Nystatin NY Cefeinme CDN Nystatin NY Cefeinme CFP Olandeomycin OL Cefepime/Sulbactam CFP Ornidazole ORN Cefeinme CFM Oxacillin OX Cefmenoxime CMX Oxolinic Acid OA Cefinetazole CMZ Oxytetracycline T Cefoinic CDZ Panipenem PAN Cefoinic CDD Penicillin G P Cefoarade CMX Oxolinic Acid PAS	Aztreonalii	AIM	Meziociiiii/Suibactam	MGD
BenzylpenicillinBZPMidecamycinMilbBeta-lactamsBETA_LACMinocyclineMIBiapenemBPMMonobactamsMONOB.CapbacephemCARBACEFMoxiloxacinMXFCarbacephemCARBACEFMoxifloxacinMVFCarbenicillinCBMupirocinMUPcarboxypenicillinsCOPENNalidixic AcidNAcarboxypenicillinsCOPENNalidixic AcidNAcarboxypenicillinsCOPENNalidixic AcidNETCaramonamCARRANCACECNifurozideNFXCefadroxilCFRNifurozideNZDCefadroxilCZNon-hydrolyzable PenicillinsPEN_MCefatrizineCefatrizineFATNitrofurantoinNBCefditorenCDRNystatinNVBCefditoren pivoxilCDNpOfloxacinOFXCefepime/SulbactamSFPOrnidazoleORNCefininxCMXOxaliniOXCefenexoneCFMOxacillinOXCefeinme/SulbactamCMXOxaliniOXCefeinmeCMXOxolinic AcidOACefininxCDZPanipenemPANCefooridCDZPanipenemPANCefooridCDZPanipenemPANCefooridCDZPanipenemPANCefooridCDZPanipenemPANCefooridCDZPanipenemPANCefooridCDZPanipenemPANC	Bacitracin	В	Micronomycin	MCR
Beta-lactamsBETA_LACMinocyclineMIBiapenemBPMMonobactamsMONDECapreomycinCAPMoxalactamMOXCarbacephemCARBACEFMoxiloxacinMXFCarbenicillinCBMupirocinMUPCarbenemsCARBAPENNafcillinNFcarboxypenicillinsCO_PEN_BLINeomycinNCarbacephamCARBAPENNafcillinNFcarboxypenicillinsW Beta-lact. Inhib.CO_PEN_BLINeomycinNCarumonamCARNetilmicinNETCefadroxilCFRNifuraideNZDCefadroxilCFRNifurozideNTTCefadroxilCFRNitrofurantoinFMCefatrizineCZNon-hydrolyzable PenicillinsPEN_MCefditorenCDNNystatinNVCefditorenCDNNystatinNVCefditorenCDNNystatinOFXCefepimeFEPOlandeomycinOLCefepime/SulbactamSFPOrnidazoleORNCeffuncaCMXOxolinic AcidOACeffuncaCMXOxolinic AcidOACeffuncaCDZPanipenemPANCefonicidCDZPanipenemPANCefonicidCDZPanipenemPANCefolizineCDZPanipenemPANCefolizineCDZPanipenemPANCefonicidCDZPanipenemPANCefonicidCDZPanipenem<	Benzylpenicillin	BZP	Midecamycin	MID
BiapenemBPMMonobactamsMONDBCappeomycinCAPMoxalactamMOXDCarbacephemCARBACEFMoxifloxacinMXFCarbenicillinCBMupirocinMUPCarbapenemsCARBAPENNafcillinNFcarboxypenicillins w/ Beta-lact. Inhib.CO_PENNalidixic AcidNAcarumonamCARNetilmicinNETCefaclorCECNifuroazideNFXCefadroxilCFRNifuroazideNZDCefadandoleMANitrofurantoinFMCefazolinCZNon-hydrolyzable PenicillinsPEN_MCefditorenCDRNovobiccinNBCefditorenCDNNystatinNYCefditorenCDNNystatinOFXCefejime/SulbactamSFPOrloxacinOFXCefetamet-pivoxilCATOthersOTHERCefetamet-pivoxilCATOthersTCefetamet-pivoxilCATOthersTCefetamet-pivoxilCTOthersTCefetamet-pivoxilCTOthersTCefetamet-pivoxilCTOthersTCefetamet-pivoxilCNXp-Aminosalicylic acidPASCefodizimeCDQParomomycinPARCefodizimeCDDParomomycinPARCefodizimeCDDParomomycinPARCefooricidCDDParomomycinPARCefooricidCDDParomomycinPARCefooricidC	Beta-lactams	BETA_LAC	Minocycline	MI
CapreomycinCAPMoxalactamMOXCarbacephemCARBACEFMoxifloxacinMXFCarbenicillinCBMupirocinMUPCarbepenemsCARBAPENNafcillinNFcarboxypenicillinsCOPENNalidixic AcidNAcarboxypenicillinsCOPEN_BLINeomycinNCarunonamCARNetilmicinNETCefaclorCECNifuroazideNFXCefadroxilCFRNifuroazideNZDCefadroxilCFRNifuroazideNITCefazolinCZNon-hydrolyzable PenicillinsPEN_MCefditorenCDRNovobiocinNBCefditorenCDNNystatinNYCefditorenCDNNystatinNYCefepime/SulbactamSFPOrnidazoleORNCefepimeFEPOlandeomycinOLCefepimeCFMOxacillinOXCefepime/SulbactamCMXOxolinic AcidOACefmoxineCMXOxolinic AcidOACeffonicidCDZPanipenemPASCefodizimeCMXOxolinic AcidOACefenenxineCMXOxolinic AcidPASCefooricidCDDParomonycinPARCefooricidCDDPanomycinPARCefooricidCDDPanomycinPARCefooricidCDNParomonycinPARCefooricidCDDPanomycinPARCefooricidCDDPanomycinPAR <td>Biapenem</td> <td>BPM</td> <td>Monobactams</td> <td>MONOBAC</td>	Biapenem	BPM	Monobactams	MONOBAC
CarbacephemCARBACEFMoxifloxacinMXFCarbepneticillinCBMupirocinMUPCarbepnetemsCARBAPENNafcillinNFcarboxypenicillinsCO_PENNalidixic AcidNAcarboxypenicillins w/ Beta-lact. Inhib.CO_PEN_BLINeomycinNCarumonamCARNetilmicinNETCefaclorCECNifuroazideNFXCefadroxilCFRNifurzideNZDCefadroxilCFRNitrofurantoinFMCefatrizineFATNitrosolineNTTCefazolinCZNon-hydrolyzable PenicillinsPEN_MCefditorenCDRNovobiocinNBCefditorenCDNNystatinNYCefditorenCDNNystatinOFXCefepime/SulbactamSFPOrnidazoleORNCefetinimeCFMOxacillinOXCefmenoximeCMXOxolinic AcidOACeffuinoxCNXp-Aminosalicylic acidPASCefodizimeCDZPanipenemPANCefodizimeCDZPanipenemPASCefodizimeCDZPanipenemPARCefodizimeCDZPanipenemPARCefonicidCIDParomonycinPARCefoperazone/SulbactamSCPPenamycinPENAWCefoperazone/SulbactamCNDPenicillin GPCeforanideCNDPenicillin GPCeforanideCNDPenicillin GP <td>Capreomycin</td> <td>CAP</td> <td>Moxalactam</td> <td>MOX</td>	Capreomycin	CAP	Moxalactam	MOX
CarbenicillinCBMupirocinMUPCarbepenemsCARBAPENNafcillinNFCarboxypenicillinsCO PENNalidixic AcidNAcarboxypenicillins w/ Beta-lact. Inhib.CO PEN_BLINeomycinNCardandamCARNetilnicinNETCefaclorCECNifurcazideNFXCefadroxilCFRNifurzideNZDCefadroxilCFRNitrofurantoinFMCefadroxinCZNon-hydrolyzable PenicillinsPEN_MCefadroxinCZNon-hydrolyzable PenicillinsPEN_MCefadrizineCDNNystatinNVCefditorenCDNNystatinNYCefditoren pivoxilCDNpOfloxacinOFXCefepimeFEPOlandeomycinOLCefepimeCFMOxacillinOXCefepimeCFMOxacillinOXCefepimeCFMOxacillinOXCefepime/SulbactamCFMOxacillinOXCefmoximeCMXOxolinic AcidOACefminoxCMXOxytetracyclineTCefminoxCDZPanipenemPANCefodizimeCDZPanipenemPANCefooperazone/SulbactamSCPPenamycinPERCefooperazone/SulbactamCNDPenicillin GPCefooranideCNDPenicillin GP	Carbacephem	CARBACEF	Moxifloxacin	MXF
CarbepenemsCARBAPENNafcillinNFcarboxypenicillinsCO_PENNalidixic AcidNAcarboxypenicillinsW/ Beta-lact. Inhib.CO_PEN_BLINeomycinNCarumonamCARNetilmicinNETCefaclorCECNifuroazideNFXCefadroxilCFRNifuroazideNZDCefaandoleMANitrofurantoinFMCefazolinCZNon-hydrolyzable PenicillinsPEN_MCefditorenCDRNovobiocinNBCefditorenCDNNystatinNYCefditorenCDNNystatinORCefeamet-pivoxilCATOthersOTHERCefeamet-pivoxilCATOthersOTHERCefetamet-pivoxilCATOthersOTHERCeffunoxCFMOxacillinOXCefetamet-pivoxilCATOthersOTHERCefetamet-pivoxilCTMOxacillinOXCefmenoximeCMXOxolinic AcidOACefmenoximeCMXOxacillinOXCefenetazoleCDZPaniposalicylic acidPASCefooperazone/SulbactamSCPPenamycinPANCefooperazone/SulbactamSCPPenamycinPENAMCefooperazone/SulbactamCTNPenicillin GPCefoorazineCTXPenicillin VPV	Carbenicillin	CB	Mupirocin	MUP
carboxypenicillinsCO_PENNalidixic AcidNAcarboxypenicillins w/ Beta-lact. Inhib.CO_PEN_BLINeomycinNCarumonamCARNetilmicinNETCefaclorCECNifuroazideNFXCefadroxilCFRNifurzideNZDCefamandoleMANitrofurantoinFMCefazolinCZNon-hydrolyzable PenicillinsPEN_MCefazolinCZNon-hydrolyzable PenicillinsPEN_MCefdtiorenCDRNovobiocinNBCefditorenCDNNystatinNYCefepimeFEPOlandeomycinOLCefepimeFFPOrnidazoleORNCefetamet-pivoxilCATOthersOTHERCefiximeCFMOxacilinOXCefemoximeCMXOxolinic AcidOACeferineCMXDxytetracyclineTCefodizimeCDZPanipenemPANCefodizimeCDZPanipenemPANCefodizimeCDZPanipenemPANCefodizimeCDZPanipenemPANCefodizimeCDZPanipenemPANCefodizimeCDDParomomycinPARCefoperazone/SulbactamSCPPenamycinPENAMCefoperazone/SulbactamCTXPenicillin GPCeforanideCNDPenicillin GP	Carbepenems	CARBAPEN	Nafcillin	NF
carboxypenicillins w/ Beta-lact. Inhib.CO PEN_BLINeomycinNCarumonamCARNetilmicinNETCefaclorCECNifuroazideNFXCefadroxilCFRNifurzideNZDCefamandoleMANitrofurantoinFMCefatrizineFATNitrosolineNITCefadorCZNon-hydrolyzable PenicillinsPEN_MCefditorenCZNon-hydrolyzable PenicillinsPEN_MCefditorenCDRNovobiocinNBCefditoren pivoxilCDNNystatinNYCefeditoren pivoxilCDNpOfloxacinOFXCefepime/SulbactamSFPOrnidazoleORNCefmenoximeCMXOxolinic AcidOACefminoxCMZOxytetracyclineTCeffininxCDZPanipenemPASCefoperazoneCFMOxacillinOXCefetamet-pivoxilCATOthersOTHERCefiximeCDZPanipenemPASCefodizimeCDZPanipenemPASCefodizimeCDZPanipenemPANCefoperazone/SulbactamSCPPenawycinPENAMCefoperazone/SulbactamSCPPenawycinPENAMCefoperazone/SulbactamCNDPenicillin GPCefotaximeCTXPenicillin VPV	carboxypenicillins	CO PEN	Nalidixic Acid	NA
Carumonam (CAR Netilmicin NET Cefaclor (CAR Netilmicin NET Cefaclor (CEC Nifuroazide NFX Cefadroxil (CFR Nifurzide NZD Cefamandole MA Nitrofurantoin FM Cefazolin (CZ Non-hydrolyzable PenicillinsPEN_M Cefazolin (CZ Non-hydrolyzable PenicillinsPEN_M Cefditoren (CDR Novobiocin NB Cefditoren (CDN Nystatin NY Cefditoren pivoxil (CDNp Ofloxacin OFX Cefepime/Sulbactam SFP Ornidazole ORN Cefetamet-pivoxil (CAR Others OTHER Cefmenoxime (CMX Oxolinic Acid OA Cefmenoxime (CDX Paninosalicylic acid PAS Cefonicid (CDZ Panipenem PAN Cefonicid (CDZ Panipenem PAN Cefoperazone (CFP Penaycin PEF Cefoperazone (CFP Penaycin PEF Cefoperazone (CFP Penaycin PEF Cefoperazone (CTX Penicillin G P Cefotaxime (CND Penicillin G P	carboxypenicilling w/ Beta-lact Inhib	CO PEN BLT	Neomycin	N
CalifornamCHCNetrinicialNHICefaclorCECNifuroazideNFXCefadroxilCFRNifurzideNZDCefamandoleMANitrofurantoinFMCefatrizineFATNitroxolineNITCefazizineCZNon-hydrolyzable PenicillinsPEN_MCefbuperazoneCFBNorfloxacinNORCefdinirCDRNovobiocinNBCefditorenCDNNystatinNYCefepimeFEPOlandeomycinOLCefepime/SulbactamSFPOrnidazoleORNCefinineCFMOxacillinOXCeffmenoximeCMXOxolinic AcidOACeffmenoximeCMXOxolinic AcidOACefmenoximeCDZPaninosalicylic acidPASCefonicidCIDParomomycinPARCefonicidCIDParomomycinPARCefoperazone/SulbactamSCPPenamycinPEFCefoperazone/SulbactamCCDZPaninosalicylic acidPARCefoperazone/SulbactamSCPPenamycinPEFCefoperazone/SulbactamCNDPenicillin GPCefotaximeCNDPenicillin VPV	Carumonam		Netilmicin	NET
CefactorCECNiturGazudeNFACefadroxilCFRNiturGazudeNZDCefamandoleMANitrofurantoinFMCefatrizineFATNitroxolineNITCefazolinCZNon-hydrolyzable PenicillinsPEN_MCefbuperazoneCFBNorfloxacinNORCefditorenCDRNovobiocinNBCefditoren pivoxilCDNNystatinNYCefditoren pivoxilCDNpOfloxacinOFXCefepimeFEPOlandeomycinOLCefepime/SulbactamSFPOrnidazoleORNCefmenoximeCMXOxolinic AcidOACefmenoximeCMXOxytetracyclineTCefodizimeCDZPanipenemPANCefonicidCIDParomomycinPARCefoperazone/SulbactamSCPPenamycinPENAMCefoperazone/SulbactamCFPPefloxacinPEFCefoperazone/SulbactamCCDPenicillin GPCefotaximeCNDPenicillin VPV	Cafagler	CEC	Nifuroarido	NEV
CefadroxiiCFRNitr2ideNZDCefamandoleMANitrofurantoinFMCefatrizineFATNitroxolineNITCefazolinCZNon-hydrolyzable PenicillinsPEN_MCefditorenCDRNovobiocinNBCefditorenCDNNystatinNYCefditoren pivoxilCDNpOfloxacinOFXCefepimeFEPOlandeomycinOLCefepime/SulbactamSFPOrnidazoleORNCefmenoximeCMXOxolinic AcidOACefmenoximeCMXOxolinic AcidOACefonicidCDZPanipenemPANCefoperazoneCFPPefloxacinPARCefoperazoneCFPPefloxacinPARCefoperazoneCDZPanipenemPARCefoperazoneCFPPefloxacinPEFCefoperazone/SulbactamSCPPenamycinPENAMCefotaximeCNDPenicillin GPCefotaximeCNDPenicillin VPV		CEC	Nifurnida	NFA
CefamindoleMANitrofurantoinFMCefatrizineFATNitroxolineNITCefazolinCZNon-hydrolyzable PenicillinsPEN_MCefbuperazoneCFBNorfloxacinNORCefditorenCDRNovobiocinNBCefditoren pivoxilCDNNystatinNYCefepimeFEPOlandeomycinOLCefetamet-pivoxilCATOthersOTHERCefmenoximeCMXOxolinic AcidOACefninoxCMZOxytetracyclineTCefodizimeCDZPaniposalicylic acidPASCefonicidCIDParomomycinPARCefoperazone/SulbactamSCPPenamycinPEFCefoperazone/SulbactamSCPPenamycinPENAMCefoperazone/SulbactamCNDPenicillin GPCefotaximeCNDPenicillin GPCefoperazone/SulbactamCCNPenamycinPENAMCefoperazone/SulbactamCNDPenicillin VPV		CFR	Niturziae	NZD
CefatrizineFATNitroxolineNITCefazolinCZNon-hydrolyzable PenicillinsPEN_MCefbuperazoneCFBNorfloxacinNORCefditorenCDRNovobiocinNBCefditoren pivoxilCDNNystatinNYCefejimeCDNOlandeomycinOLCefepime/SulbactamSFPOrnidazoleORNCefetamet-pivoxilCATOthersOTHERCefeininoxCFMOxacillinOXCefenoximeCMZOxytetracyclineTCefodizimeCDZPaniposalicylic acidPASCefodizimeCDZPanipenemPANCefoperazone/SulbactamSCPPenamycinPENAMCefoperazone/SulbactamCNDPenicillin GPCefotaximeCNDPenicillin GPCefotaximeCNDPenicillin VPV	Ceramandole	MA	Nitroiurantoin	FM
CefazolinCZNon-hydrolyzable PenicillinsPEN_MCefbuperazoneCFBNorfloxacinNORCefditorenCDRNovobiocinNBCefditoren pivoxilCDNNystatinNYCefditoren pivoxilCDNpOfloxacinOFXCefepimeFEPOlandeomycinOLCefepime/SulbactamSFPOrnidazoleORNCefeiximeCFMOxacillinOXCefmenoximeCMXOxolinic AcidOACefedizineCDZPaminosalicylic acidPASCefodizimeCDZPanipenemPANCefoperazone/SulbactamSCPPenamycinPENAMCefoperazone/SulbactamCNDPenicillin GPCefotaximeCNDPenicillin GP	Cefatrizine	F.A.I.	Nitroxoline	NT.I.
CefbuperazoneCFBNorfloxacinNORCefdinirCDRNovobiocinNBCefditorenCDNNystatinNYCefditoren pivoxilCDNpOfloxacinOFXCefepimeFEPOlandeomycinOLCefepime/SulbactamSFPOrnidazoleORNCefetamet-pivoxilCATOthersOTHERCefmenoximeCMXOxolinic AcidOACefmenoximeCMXOxolinic AcidOACefminoxCNZp-Aminosalicylic acidPASCefonicidCIDParomomycinPARCefoperazoneCFPPefloxacinPEFCefoperazone/SulbactamSCPPenamycinPENAMCefotaximeCNDPenicillin GPCefotaximeCNDPenicillin VPV	Cefazolin	CZ	Non-hydrolyzable Penicilling	spen_m
CefdinirCDRNovobiocinNBCefditorenCDNNystatinNYCefditoren pivoxilCDNpOfloxacinOFXCefepimeFEPOlandeomycinOLCefepime/SulbactamSFPOrnidazoleORNCefetamet-pivoxilCATOthersOTHERCefiximeCFMOxacillinOXCefmenoximeCMXOxolinic AcidOACefmenoximeCMZOxytetracyclineTCefninoxCNXp-Aminosalicylic acidPASCefodizimeCDZPanipenemPANCefoperazoneCFPPefloxacinPEFCefoperazone/SulbactamSCPPenamycinPENAMCefotaximeCNDPenicillin GPCefotaximeCNDPenicillin VPV	Cefbuperazone	CFB	Norfloxacin	NOR
CefditorenCDNNystatinNYCefditoren pivoxilCDNpOfloxacinOFXCefepimeFEPOlandeomycinOLCefepime/SulbactamSFPOrnidazoleORNCefetamet-pivoxilCATOthersOTHERCefiximeCFMOxacillinOXCefmenoximeCMXOxolinic AcidOACefmetazoleCMZOxytetracyclineTCefodizimeCDZPanipenemPANCefonicidCIDParomomycinPARCefoperazone/SulbactamSCPPenamycinPENAMCefotaximeCNDPenicillin GPCefotaximeCNDPenicillin VPV	Cefdinir	CDR	Novobiocin	NB
Cefditoren pivoxilCDNpOfloxacinOFXCefepimeFEPOlandeomycinOLCefepime/SulbactamSFPOrnidazoleORNCefetamet-pivoxilCATOthersOTHERCefiximeCFMOxacillinOXCefmenoximeCMXOxolinic AcidOACefminoxCNXp-Aminosalicylic acidPASCefonicidCIDParomomycinPARCefoperazone/SulbactamSCPPenamycinPEFAMCefotaximeCNDPenicillin GPCefotaximeCNDPenicillin VPV	Cefditoren	CDN	Nystatin	NY
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	Cefotaxime	CTX	Penicillin V	PV

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Daptomycin     DAP     Tetracyclines     TET       Dibekacin     DKB     Thiacetazone     TB1       Dicloxacillin     DX     Thiamphenicol     TP       Difloxacin     DFX     Ticarcillin     TIC       Dihydrofolate reductase inhibitor     DHFR_INH     Ticarcillin/Clavulanate     TIL       Dihydrofolate reduct./Dihydropteroate synDHFR_DHPS_INH     Tilmicosin     TIL       Dihydropteroate synthetase inhibitor     DHY_INH     Tobramycin     NN	
Dibekacin     DKB     Thiacetazone     TB1       Dicloxacillin     DX     Thiamphenicol     TP       Difloxacin     DFX     Ticarcillin     TIC       Dihydrofolate reductase inhibitor     DHFR_INH     Ticarcillin/Clavulanate     TIL       Dihydrofolate reduct./Dihydropteroate synDHFR_DHPS_INH     Tilmicosin     TIL       Dihydropteroate synthetase inhibitor     DHYS_INH     Tobramycin     NN	
Dicloxacillin DX Thiamphenicol TP Difloxacin DFX Ticarcillin TIC Dihydrofolate reductase inhibitor DHFR_INH Ticarcillin/Clavulanate TIM Dihydrofolate reduct./Dihydropteroate synDHFR_DHPS_INH Tilmicosin TIL Dihydropteroate synthetase inhibitor DHPS_INH Tobramycin NN	
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Doxycycline D Illineth/Sulla (DIN) Sig	
Encodel ENA III internetion internetion (Sulfadiazine SDT	
Enicilian EP Trimethoprim/SulfamethozolSXT	
Ervthromycin E Triple Sulfa SSS	
Ethambutol EM Trospectinomycin TRP	
Ethionamide EA Trovafloxacin TVA	
Fleroxacin FLE Tylosin TYL	
Flomoxef FLO Unspecified UNS	
Flucloxacillin FO ureidopenicillins UR	
Flumequine FLO ureidopenicillins w/ B-lact UR	PEN
	PEN PEN BLI
Fluoroquinilones FQUIN Urinary fluoroquinilones UR	PEN PEN_BLI FQUIN
Fluoroquinilones     FQUIN     Urinary fluoroquinilones     UR       Folate antagonists     FOL_ANT     Vancomycin     VA	PEN PEN_BLI FQUIN

# 13. Appendix D – Organism Abbreviations

The following is a list of the organisms in the BD database, with the associated LIS Code. On the EpiCenter and BD Phoenix 100, these codes are configurable by the user. However on the MGIT and ProbeTec ET instruments these values are not configurable. Therefore a direct instrument interface sends these values as AST results.

Abiotrophia	ABI	Lactobacillus catenaformis	LACBCAT
Abiotrophia defectiva	STRDEF	Lactobacillus crispatus	LACBCRI
Acholeplasma	ACHO	Lactobacillus delbrueckii ssp bulgaricus	LACBDELB
Acholeplasma laidlawii	ACHOLAI	Lactobacillus delbrueckii ssp delbrueckii	LACBDELD
Achromobacter	ACHR	Lactobacillus delbrueckii ssp lactis	LACBDELL
Achromobacter piechaudii	ALCPIE	Lactobacillus fermentum	LACBFER
Achromobacter species	ACHRSPE	Lactobacillus gasseri	LACEGAS
Achromobacter xylosoxidans ssp denitriii(	CALCDEN	Lactopacillus jensenii	LACBJEN
Achromobacter Xylosoxidans ssp Xylosoxida	ALCAIL	Lactobacillus jonnsonii	LACBUOH
Acid Fast Pagilli (Group)	AFD	Lactobacillus paraplantarum	LACEREF
Acidaminococcus	ACTA	Lactobacillus plantarum	LACEPIA
Acidaminococcus fermentans	ACIAFER	Lactobacillus reuteri	LACBREII
Acidovorax	ACID	Lactobacillus rhamposus	LACBRHA
Acidovorax delafieldii	ACIDDEL	Lactobacillus salivarius	LACBSAL
Acidovorax facilis	ACIDFAC	Lactobacillus species	LACBSPE
Acidovorax temperans	ACIDTEM	Lactobacillus uli	LACBULI
Acinetobacter	ACIN	Lactococcus	LACC
Acinetobacter baumannii	ACINBAU	Lactococcus garvieae	LACCGAR
Acinetobacter baumannii/calcoaceticus com	MACINBCX	Lactococcus lactis ssp cremoris	LACCLACC
Acinetobacter baumannii/haemolyticus	ACINBAUHAE	Lactococcus lactis ssp hordniae	LACCLACH
Acinetobacter calcoaceticus	ACINCAL	Lactococcus lactis ssp lactis	LACCLACL
Acinetobacter haemolyticus	ACINHAE	Lactococcus plantarum	LACCPLA
Acinetobacter johnsonii	ACINJOH	Lactococcus raffinolactis	LACCRAF
Acinetobacter junii	ACINJUN	Lactococcus species	LACCSPE
Acinetobacter lwoffii	ACINLWO	Lautropia	LAU
Acinetobacter lwoffii/haemolyticus	ACINLWOHAE	Lautropia mirabilis	LAUMIR
Acinetobacter radioresistens	ACINRAD	Leclercia	LEC
Acinetopacter species	ACINSPE	Leciercia adecarboxylata	LECADE
Actinobacillus actinomycotomcomitere	ACIB	Legionella anica	LEGANT
Actinobacillus cansulatus	ACIDACI	Legionella hirminghamangig	LEGRIP
Actinobacillus capsulatus	ACIBCAP	Legionella bozemaniae	LEGBIR
Actinobacillus hominis	ACTBHOM	Legionella cincinnatiensis	LEGECIN
Actinobacillus lignieresii	ACTBLIG	Legionella dumoffii	LEGDIM
Actinobacillus muris	ACTBMIR	Legionella feeleii	LEGFEE
Actinobacillus pleuropneumoniae	ACTBPLE	Legionella gormanii	LEGGOR
Actinobacillus rossii	ACTBROS	Jegionella hackeliae	LEGHAC
Actinobacillus seminis	ACTBSEM	Legionella israelensis	LEGISR
Actinobacillus species	ACTBSPE	Legionella jordanis	LEGJOR
Actinobacillus suis	ACTBSUI	Legionella lansingensis	LEGLAN
Actinobacillus ureae	ACTBURE	Legionella longbeachae	LEGLON
Actinobaculum	ACTC	Legionella maceachernii	LEGMAC
Actinobaculum schaalii	ACTCSCH	Legionella micdadei	LEGMIC
Actinobaculum suis	ACTMSUI	Legionella oakridgensis	LEGOAK
Actinomadura	ACTA	Legionella pneumophila	LEGPNE
Actinomadura madurae	ACTAMAD	Legionella pneumophila ssp fraseri	LEGPNEF
Actinomadura pelletieri	ACTAPEL	Legionella pneumophila ssp pascullei	LEGPNEPA
Actinomyces	ACTM	Legionella pneumophila ssp pneumophila	LEGPNEPN
Actinomyces bovis	ACTMBOV	Legionella sainthelensi	LEGSAL
Actinomyces denticolens	ACIMDEN	Legionella species	LEGSPE
Actinomyces europaeus	ACTMEDE	Legionella wadsworthij	LEGIUC
Actinomyces gerencseriae	ACTMGER	Leifsonia	LEGNAD
Actinomyces graevenitzii	ACTMGRA	Leifsonia aquatica	CORAOU
Actinomyces hordeovulneris	ACTMHOR	Leminorella	LEM
Actinomyces howelli	ACTMHOW	Leminorella grimontii	LEMGRI
Actinomyces hyovaginalis	ACTMHYO	Leminorella richardii	LEMRIC
Actinomyces israelii	ACTMISR	Leminorella species	LEMSPE
Actinomyces meyeri	ACTMMEY	Leptotrichia	LEP
Actinomyces naeslundii	ACTMNAE	Leptotrichia buccalis	LEPBUC
Actinomyces neuii ssp anitratus	ACTMNEUA	Leuconostoc	LEU
Actinomyces neuii ssp neuii	ACTMNEUN	Leuconostoc argentinum	LEUARG
Actinomyces odontolyticus	ACTMODO	Leuconostoc carnosum	LEUCAR
Actinomyces radingae	ACTMRAD	Leuconostoc citreum	LEUCIT
Actinomyces slackii	ACTMSLA	Leuconostoc gellaum	LEUGEL
Actinomyces species Actinomyces turicensis	ACTIMITE	Leuconostoc mesenteroides	LEUMEC
Actinomyces turicensis	ACIMIUR	Leuconostoc mesenteroides sep gremoris	LEUMES
Aerococcus	AFPC	Leuconostoc mesenteroides ssp dextranicum	LEUMESD
Aerococcus species	AERCSPE	Leuconostoc mesenteroides ssp mesenteroides	LEUMESM
Aerococcus urinae	AERCURI	Leuconostoc pseudomesenteroides	LEUPSE
Aerococcus viridans	AERCVIR	Leuconostoc species	LEUSPE
Aeromonas	AERM	Listeria	LIS
Aeromonas allosaccharophila	AERMALL	Listeria grayi	LISGRA
Aeromonas caviae	AERMCAV	Listeria innocua	LISINN
Aeromonas hydrophila	AERMHYD	Listeria ivanovii	LISIVA
Aeromonas hydrophila group	AERMHYDGR	Listeria ivanovii ssp ivanovii	LISIVAI
Aeromonas jandaei	AERMJAN	Listeria ivanovii ssp londoniensis	LISIVAL
Aeromonas media	AERMMED	Listeria monocytogenes	LISMON
Aeromonas salmonicida	AERMSAL	Listeria monocytogenes/innocua	LISMONINN
Aeromonas salmonicida ssp achromogenes	AERMSALA	Listeria murrayi	LISMUR
Aeromonas saimonicida sep masoucida	ARKMBALM	Listeria geoligeri	LISMUKGRA
Aeromonas salmonicida sep salmonicida	ABRIGALSA AFRMGALCM	Listeria species	TTOORE TTOORE
Actomonas satmoniciua sep smithla Acromonas schubertij	ABAMSCH	Listeria welchimeri	LISSFE
Aeromonas sobria	AERMVERS	Listonella	LISO
Aeromonas species	AERMSPE	Listonella anguillarum	LISOANG
Aeromonas trota	AERMTRO	Listonella pelagia	LISOPEL
Aeromonas veronii	AERMVERV	Macrococcus	MAC
Afipia	AFI	Macrococcus caseolyticus	STACAS

Afipia broomeae Afipia clevelandensis Afipia felis A ET D DO AFICLE AFIFEL Agrobacterium AGR Agrobacterium radiobacter Agrobacterium tumefaciens AGRRAD AGRTUM Agrobacterium tumeraciens Alcaligenes Alcaligenes faecalis Alcaligenes faecalis sp faecalis Alcaligenes faecalis type II Alcaligenes species Alloicocccus Alloicoccus otitidis Anaerobiosnirillum ALC ALCEAE ALCFAEF ALCFAEI ALCSPE ALL ALLOTI Allolococcus ofilidis Anaerobiospirillum Anaerobiospirillum succiniciproducens Anaerobiospirillum thomasii Anaerorhabdus Anaerorhabdus furcosa ANAB ANAB ANABTHC ANAR ANARFUR Anaerorhabdus furcosa Arcanobacterium Arcanobacterium bernardiae Arcanobacterium haemolyticum Arcanobacterium pyogenes ARCA ARCABER ARCAHAE ACTMPYO Arcobacter Arcobacter butzleri ARCO ARCOBUT Arcobacter butzleri Arcobacter cryaerophilus Arcobacter nitrofigilis Arcobacter skirrowii Arthrobacter Arthrobacter agilis Arthrobacter cenatinolyticus Arthrobacter cumminsii Arthrobacter cumminsii ARCOCRY ARCONTT ARCOSKI ART ARTAGI ARTCRE Arthrobacter cumminsii Arthrobacter woluwensis ARTWOL Aspergillus fumigatus Aspergillus species ASP ASPFUM ASPSPE Atopobium Atopobium minutum Atopobium parvulum Atopobium rimae ATO ATOMIN ATOPAR LACBRIM Aureobacterium AURC Aureobacterium Aureobasidium Aureobasidium pullulans AURCRES AUR AURPUL BACI BACIAMY BACIANT Bacillus Bacillus amyloliquefaciens Bacillus anthracis Bacillus cereus BACICER Bacillus circulans Bacillus coagulans Bacillus firmus Bacillus licheniformis BACTCTR BACICOA BACIFIR BACILIC Bacillus licheniformis Bacillus megaterium Bacillus mycoides Bacillus pasteurii Bacillus pumilus Bacillus sphaericus Bacillus schaericus Bacillus stearothermophilus Bacillus subrilis BACIMEG BACIMYC BACIPAS BACTPUN BACISPE BACISPH BACISTE Bacillus stearothermopnilus Bacillus subtilis Bacillus subtilis ssp spizizenii Bacillus subtilis ssp subtilis Bacillus thuringiensis Pactornides BACTSUB BACISUB BACISUB Bactilus thuringiensis Bacteroides Bacteroides caccae Bacteroides capillosus Bacteroides cogulans Bacteroides distasonis Bacteroides distasonis group Bacteroides gegerthii Bacteroides forsythus Bacteroides fragilis Bacteroides fragilis group Bacteroides magilis group Bacteroides magilis group BACITHU BACT BACTCAC BACTCOA BACTDIS BACTEGG BACTFOR BACTFRA Bacteroides fragilis grou Bacteroides merdae Bacteroides ovatus Bacteroides putredinis Bacteroides splanchnicus Bacteroides stercoris BACTMER BACTOVA BACTPUT BACTSPL BACTSTT Bacteroides tectus Bacteroides thetaiotaomicron BACTTEC Bacteroides unecalotadmi Bacteroides ureolyticus Bacteroides vulgatus BACTUNI BACTURE BACTVUL Balneatrix Balneatrix alpica BAL BALALP Bartonella bacilliformis BAR BARBAC Bartonella clarridgeiae Bartonella elizabethae BARCLA BARELT Bartonella elizabethae Bartonella henselae Bartonella guintana Bartonella species Bergeyella Bergeyella zoohelcum Bifidobacterium Bifidobacterium BARHEN BARQUI BARSPE BER BERZOO BIF BIFADO Bifidobacterium angulatum Bifidobacterium bifidum BIFANG BIFBIF 
 Bifidobacterium bifidum
 BIFBIF

 Bifidobacterium oreve
 BIFBRE

 Bifidobacterium catenulatum
 BIFCAT

 Bifidobacterium denticolens
 BIFDEN

 Bifidobacterium gallicum
 BIFGAL

 Bifidobacterium infantis
 BIFINF

 Bifidobacterium inopinatum
 BIFINO

 Bifidobacterium speudocatenulatum
 BIFINO

 Bifidobacterium pseudocatenulatum
 BIFPLON

	Malassezia	MAL
	Malassezia furfur Malassezia globosa	MALFUR
	Malassezia obtusa	MALOBT
	Malassezia pachydermatis	MALPAC
	Malassezia restricta	MALRES
	Malassezia sloofiae	MALSLO
,	Malassezia sympodialis	MALSPE
I	Mannheimia	MAN
	Mannheimia haemolytica	PASHAE
	Megamonas Megamonas	MEGM
	Megamonas nypermegare	MEGS
:	Megasphaera elsdenii	MEGSELS
)	Methylobacterium	MET
	Methylobacterium extorquens	METEXT
	Methylobacterium mesophilicum	METTMES
1	Methylobacterium species	METSPE
	Microbacterium	MICB
)	Microbacterium arborescens	MICBARB
,	Micrococcus	MICBIMP
	Micrococcus luteus	MICLUT
	Micrococcus lylae	MICLYL
	Micrococcus species	MICSPE
	Micromonas micros	PEPSMIC
	Mitsuokella	MIT
	Mitsuokella multiacida	MITMUL
	Mobiluncus	MOB
	Mobiluncus mulieris	MOBMUL
	Mobiluncus species	MOBSPE
	Moellerella	MOE
	Moellerella wisconsensis	MOEWIS
ſ	Mogibacterium timidum	EUBTIM
	Moraxella	MORA
	Moraxella (Branhamella) catarrhalis	MORABRACAT
	Moraxella atlantae Moraxella bouig	MORAATL
	Moraxella canis	MORACAN
	Moraxella caviae	MORACAV
	Moraxella cuniculi	MORACUN
	Moraxella lincolnii	MORALAC
	Moraxella nonliquefaciens	MORANON
1	Moraxella osloensis	MORAOSL
	Moraxella ovis	MORAOVI
1	Morganella	MORG
	Morganella morganii	
·	Morganeria morganiri	MORGMOR
I	Morganella morganii ssp morganii	MORGMOR
, [ ]	Morganella morganii ssp morganii Morganella morganii ssp morganii biogroup 1 Morganella morganii ssp sibonii	MORGMOR MORGMORM MORGMORM1
, 1 1 1 1	Morganella morganii ssp morganii Morganella morganii ssp morganii biogroup 1 Morganella morganii ssp sibonii Mycobacterium	MORGMOR MORGMORM MORGMORM1 MORGMORS MYCB
, I I I S	Morganella morganii ssp morganii Morganella morganii ssp morganii biogroup 1 Morganella morganii ssp sibonii Mycobacterium Mycobacterium	MORGMOR MORGMORM MORGMORM1 MORGMORS MYCB MYCBABS
I I I SP	Morganella morganii ssp morganii Morganella morganii ssp morganii biogroup 1 Morganella morganii ssp sibonii Mycobacterium Mycobacterium abscessus Mycobacterium africanum	MORGMOR MORGMORM MORGMORM1 MORGMORS MYCB MYCBABS MYCBABS MYCBAFR
I I ISP ISU	Morganella morganii ssp morganii Morganella morganii ssp morganii biogroup 1 Morganella morganii ssp sibonii Mycobacterium abscessus Mycobacterium africanum Mycobacterium africanum Mycobacterium agiaticum	MORGMOR MORGMORM1 MORGMORS MYCB MYCBABS MYCBASI MYCBAIR MYCBAIR
I I I S S P S S U I	Morganella morganii ssp morganii Morganella morganii ssp morganii biogroup 1 Morganella morganii ssp sibonii Mycobacterium Mycobacterium afscessus Mycobacterium africanum Mycobacterium asiaticum Mycobacterium aurum Mycobacterium aurum	MORGMOR MORGMORM MORGMORS MYCB MYCBABS MYCBAFR MYCBASI MYCBAUR MYCBAVI
I SP SU	Morganella morganii ssp morganii Morganella morganii ssp morganii biogroup 1 Morganella morganii ssp sibonii Mycobacterium Mycobacterium abscessus Mycobacterium aficanum Mycobacterium asiaticum Mycobacterium aurum Mycobacterium avum	MORGMOR MORGMORM MORGMORMI MORGMORS MYCB MYCBABS MYCBASI MYCBASI MYCBAVI MYCBAVI MYCBAVI
I SP SSU J	Morganella morganii ssp morganii Morganella morganii ssp morganii biogroup 1 Morganella morganii ssp sibonii Mycobacterium Mycobacterium abscessus Mycobacterium africanum Mycobacterium agiaticum Mycobacterium arum Mycobacterium arum Mycobacterium avium Mycobacterium avium ssp avium Mycobacterium avium ssp avium	MORGMOR MORGMORM MORGMORMI MORGMORS MYCBABS MYCBABS MYCBASI MYCBAUR MYCBAUI MYCBAVI MYCBAVIA MYCBAVIA
SP SU SU	Morganella morganii ssp morganii Morganella morganii ssp morganii biogroup 1 Morganella morganii ssp sibonii Mycobacterium abscessus Mycobacterium africanum Mycobacterium africanum Mycobacterium avium Mycobacterium avium Mycobacterium avium Mycobacterium avium ssp avium Mycobacterium avium ssp paratuberculosis Mycobacterium avium ssp silvaticum	MORGMOR MORGMORM MORGMORM MORGMORS MYCBA MYCBABS MYCBASI MYCBAVI MYCBAVI MYCBAVIA MYCBAVIA MYCBAVIA
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Bifidobacterium pseudolongum ssp pseudolo	DBIFPSEP	Mycobacterium triviale
Bifidobacterium species	BIFSPE	Mycobacterium tuberculosis
Bilophila	BIL	Mycobacterium tuberculosis complex
Bilophila Wadsworthia	BILWAD	Mycobacterium ulcerans
Blastoschizomyces	BLA	Mycobacterium vaccae
Bordetella	BOR	Mycoplagma
Bordetella avium	BORAVI	Mycoplasma (Group)
Bordetella bronchiseptica	BORBROS	Mycoplasma (Group2)
Bordetella hinzii	BORHIN	Mycoplasma buccale
Bordetella holmesii	BORHOL	Mycoplasma faucium
Bordetella parapertussis	BORPAR	Mycoplasma fermentans
Bordetella pertussis	BORPER	Mycoplasma gallisepticum
Bordetella trematum	BORTRE	Mycoplasma genitalium
Borrelia	BOI	Mycoplasma hominis
Borrelia species	BOISPE	Mycoplasma lipophilum
Brachyspira	BRAC	Mycoplasma orale
Brachyspira aalborgi	BRACAAL	Mycoplasma penetrans
Brachyspira hyodysenteriae	BRACHYO	Mycopiasma pirum
Brachyspira innocens	BRACINN	Mycoplasma prieumoniae
Pradurhizohium	DRACFIL	Mycoplasma primacum Mycoplasma calivarium
Bradyrhizobium japonicum	BRADITAP	Mycoplasma spermatophilum
Brevibacillus	BRES	Mycoplasma synoviae
Brevibacillus brevis	BACIBRE	Myroides
Brevibacillus laterosporus	BACILAT	Myroides odoratimimus
Brevibacterium	BREI	Myroides odoratus
Brevibacterium casei	BREICAS	Myroides odoratus/odoratimimus
Brevibacterium epidermidis	BREIEPI	Neisseria
Brevibacterium linens	BREILIN	Neisseria canis
Brevibacterium mcbrellneri	BREIMCB	Neisseria cinerea
Brevibacterium species	BREISPE	Neisseria elongata
Brevundimonas	BREU	Neisseria elongata ssp elongata
Brevundimonas diminuta	BREUDIM	Neisseria elongata ssp glycolytica
Brevundimonas vesicularis	BREUVES	Neisseria elongata ssp nitroreducens
Brucella	BRU	Neisseria flavescens
Brucella abortus	BRUABO	Neisseria gonorrhoeae
Brucella canis	BRUCAN	Neisseria iguanae
Brucella melitensis	BRUMEL	Nelsseria lactamica
Brucella neolomae	BRUNEU	Neisseria meningitidis
Prucella ovis	DRUCVI	Neisseria nolycacharea
Prucella species	DRUSPE	Neisseria polysaccharea
Budvicia	BIID	Neisseria sicca
Budvicia aquatica	BUDAOU	Neisseria subflava
Burkholderia	BUR	Neisseria subflava biovar flava
Burkholderia carvophvlli	BURCAR	Neisseria subflava biovar perflava
Burkholderia cepacia	BURCEP	Neisseria subflava biovar subflava
Burkholderia cepacia (CF)	BURCEPCF	Neisseria weaveri
Burkholderia cepacia/Ralstonia pickettii	BURCEPRALPIC	Nesterenkonia
Burkholderia gladioli	BURGLA	Nesterenkonia halobia
Burkholderia glathei	BURGLT	Nocardia
Burkholderia graminis	BURGRA	Nocardia asteroides
Burkholderia mallei	BURMAL	Nocardia brasiliensis
Burkholderia multivorans	BURMUL	Nocardia brevicatena
Burkholderia phenazinium	BURPHE	Nocardia carnea
Burkholderia pseudomallei	BURPSE	Nocardia farcinica
Burkholderia pyrrocinia	BURPIR	Nocardia nova
Burkholderia species/kaistonia species	BURSPERALSPE	Nocardia otitidiscaviarum
Burkholderia/Raistonia	BUR/RAL	Nocardia pseudobrasiliensis
Puttiauxella agregic		Nocardia species
Buttiauxella ferragutiae	BUTTEEP	Nocardia transvalensis
Buttiauxella gaviniae	BUTTGAV	Nocardia vaccinii
Butyrivibrio	BUTY	Nocardiopsis
Butyrivibrio crossotus	BUTYCRO	Nocardiopsis dassonvillei
Butvrivibrio fibrisolvens	BUTYFIB	Obesumbacterium
Calymmatobacterium	CALY	Obesumbacterium proteus
Campylobacter	CAM	Ochrobactrum
Campylobacter coli	CAMCOL	Ochrobactrum anthropi
Campylobacter concisus	CAMCON	Oenococcus
Campylobacter curvus	CAMCUR	Oenococcus oeni
Campylobacter fetus	CAMFET	Oerskovia
Campylobacter fetus ssp fetus	CAMPETF	Oerskovia species
Campylobacter fetus ssp venerealis	CAMPETV	Oligalla
Campylobacter graciiis	CAMBRA	Oligella species
Campylobacter herveticus	CAMHYOH	Oligella ureolytica
Campylobacter hyointestinalis ssp lawson:	CAMHYOL	Oligella urethralis
Campylobacter jejuni	CAMJEJ	Ornithobacterium
Campylobacter jejuni ssp dovlei	CAMJEJD	Ornithobacterium rhinotracheale
Campylobacter jejuni ssp jejuni	CAMJEJJ	Paenibacillus
Campylobacter lari	CAMLAR	Paenibacillus alvei
Campylobacter mucosalis	CAMMUC	Paenibacillus durus
Campylobacter rectus	CAMRET	Paenibacillus macerans
Campylobacter rectus/curvus	CAMRETCUR	Paenibacillus polymyxa
Campylobacter showae	CAMSHO	Pantoea
Campylobacter species	CAMSPE	Pantoea agglomerans
Campylobacter sputorum ssp bubulus	CAMSPUB	Pantoea ananatis
campylobacter sputorum ssp fecalis	CAMSPUF	Pantoea dispersa
Lampylobacter sputorum ssp paraureolyticu	CAMEDUC	Pantopa stewartii ssp indologenes
Campylobacter spulorum ssp spulorum	CAMIDE	Parteurella
CampyiODacter upSalleNSIS	CAMUTS	Pasteurella aerogenes
Canulua Candida aageri	CANAAS	Pasteurella bettyze
Candida albicans	CANALB	Pasteurella caballi
Candida boidinij	CANBOT	Pasteurella camis
Candida catenulata	CANCAT	Pasteurella dagmatis
Candida ciferrii	CANCIF	Pasteurella gallinarum
Candida colliculosa	CANCOL	Pasteurella multocida
Candida dubliniensis	CANDUB	Pasteurella multocida ssp gallicida
Candida famata	CANFAM	Pasteurella multocida ssp multocida
Candida glabrata	TORGLA	Pasteurella multocida ssp septica
Candida guilliermondii	CANGUI	Pasteurella pneumotropica
Candida haemulonii	CANHAE	Pasteurella species
Candida holmii	CANHOL	Pasteurella stomatis
Candida incongniqua	CANINC	Pasteurella trebalosi

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Candida kefyr
Candida krusei
Candida lambica
Candida lipolytica
Candida lugitaniae
Candida magnoliac
Canulua magnorrae
Candida meribiosica
Candida norvegensis
Candida parakrusei
Candida parapsilosis
Candida pelliculosa
Candida pintelenegii
Candida pulchowing
candida puicherrima
Candida rugosa
Candida species
Candida sphaerica
Candida stellatoidea
Candida tropicalis
Candida utilis
Candida ucilis
Candida valida
Candida viswanathii
Candida zeylanoides
Capnocytophaga
Capnocytophaga canimorsus
Capnocytophaga cynodegmi
Capnocytophaga cinciuslic
Capilocycopilaga giligivaiis
Capnocytopnaga granulosa
Capnocytophaga haemolytica
Capnocytophaga ochracea
Capnocytophaga species
Capnocytophaga sputigena
Cardiobacterium
Cardiobactorium hominia
Caldiobaccerium nominis
Catonella
Catonella morbi
CDC
CDC group DF-3
CDC group EE-4
CDC group EF-4a
CDC group EF-4a
CDC group EF-4b
CDC group EO-2
CDC group EO-3
CDC group II b
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CDC group IV
CDC group NO-1
CDC group 0-1
CDC group 0-2
CDC group OFBA-1
CDC group Vb-3
CDC group VD-3
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Cedecea Cedecea davisae Cedecea lapagei Cedecea neteri Cedecea species 3 Cedecea species 3 Cedecea species 5 Cellulomonas humilata Cellulomonas humilata Cellulomonas humilata Cellulomonas humilata Cellulomonas humilata Cellulomonas humilata Centipeda Centipeda periodontii Chromobacterium violaceum Chryseobacterium lologenes Chryseobacterium indologenes Chryseobacterium scophthalmum Chryseobacterium scophthalmum Chryseobacterium scophthalmum Chryseobacterium scophthalmum Chryseobacterium scophthalmum Chryseobacter in scophthalmum Chryseobacter freundii Citrobacter freundii Citrobacter freundii Citrobacter freundii Citrobacter freundii Citrobacter rodentium Citrobacter seelakii Citrobacter seelakii Ciostridium argentinense Clostridium biermentans Clostridium biermentans Clostridium botulinum Clostridium cataum Clostridium celatum Clostridium cochearium Clostridium cochearium Clostridium cochearium Clostridium cochearium

CANKEE	Pasteurella volantium	PASVOL.
CANKRU	Pediococcus	PED
CANLAM	Pediococcus acidilactici	PEDACI
CANLIP	Pediococcus damnosus	PEDDAM
CANLOS	Pediococcus parvulus	PEDDEX
CANMEL	Pediococcus pentosaceus	PEDPEN
CANNOR	Pediococcus species	PEDSPE
CANPARK	Peptococcus	PEPC
CANPARP CANPEL	Peptococcus niger Peptostreptococcus	PEPCNIG
CANPIN	Peptostreptococcus anaerobius	PEPSANA
CANPUL	Peptostreptococcus asaccharolyticus	PEPSASA
CANRUG	Peptostreptococcus barnesae	PEPSBAR
CANSPE	Peptostreptococcus harei	PEPSHAR
CANSTE	Peptostreptococcus indolicus	PEPSTID
CANTRO	Peptostreptococcus ivorii	PEPSIVO
CANUTI	Peptostreptococcus lacrimalis	PEPSLAR
CANVAL	Peptostreptococcus lactolyticus	PEPSLAT
CANVIS	Peptostreptococcus octavius	PEPSOCT
CAP	Peptostreptococcus species	PEPSSPE
CAPCAN	Peptostreptococcus tetradius	PEPSTET
CAPCYN	Peptostreptococcus vaginalis	PEPSVAG
CAPGIN	Photobacterium	PHOB
CAPGRA	Photobacterium damselae sep damselae	PHOBDAMD
CAPOCH	Photobacterium damselae ssp piscicida	PHOBDAMP
CAPSPE	Photorhabdus	PHOR
CAPSPU	Photorhabdus luminescens	PHORLUM
CAR	Pichia Dichia annuata	PIC
CARHOM	Pichia angusta Dichia anomala	HANANO
CATOMOR	Pichia fermentans	PICFER
CDC	Plesiomonas	PLE
CDCDF3	Plesiomonas shigelloides	PLESHI
CDCEF4	Porphyromonas	POR
CDCEF4a CDCEF4b	Porphyromonas canoris	PORASA
CDCE02	Porphyromonas catoniae	PORCAT
CDCEO3	Porphyromonas circumdentaria	PORCIR
CDCIIb	Porphyromonas endodontalis	POREND
CDCIIg	Porphyromonas gingivalis	PORGIN
CDCIII	Porphyromonas macacae	PORLEV
CDCIV	Pragia	PRA
CDCNO1	Pragia fontium	PRAFON
CDC01	Prevotella	PRE
CDCO2 CDCOERA1	Prevotella albensis Prevotella bivia	PREALB
CDCVb3	Prevotella brevis	PREBRE
CDCW01	Prevotella bryantii	PREBRY
CED	Prevotella buccae	PREBUE
CEDDAV	Prevotella buccalis	PREBUL
CEDNET	Prevotella dentalis	PREDEA
CEDSPE	Prevotella denticola	PREDEI
CEDSPE3	Prevotella disiens	PREDIS
CEDSPE5	Prevotella enoeca	PREENO
CEL	Prevotella heparinolytica Prevotella intermedia	PREHEP
OERTUR	Prevotella loescheij	PRELOE
CEN	Prevotella melaninogenica	PREMEL
CENPER	Prevotella nigrescens	PRENIG
CHRO	Prevotella oralis	PREORA
CHROVIO	Prevotella oulorum	PREORI
CHRBGLE	Prevotella ruminicola	PRERUM
CHRBIND	Prevotella tannerae	PRETAN
CHRBMEN	Prevotella veroralis	PREVER
CHRBSCO	Prevotella zoogleoformans Propionibacterium	PREZOO
CIT	Propionibacterium acidipropionici	PROBACI
CITAMA	Propionibacterium acnes	PROBACN
CITBRA	Propionibacterium avidum	PROBAVI
CITERE	Propionibacterium avidum ssp granulosum	PROBAVIG
CITFRECX	Propionibacterium freundenreichii ssp shermanii	PROBERES
CITSPE10	Propionibacterium granulosum	PROBGRA
CITKOS	Propionibacterium jensenii	PROBJEN
CITSPE11	Propionibacterium lymphophilum	PROBLYM
CITSPE9	Propionibacterium propionicum Propionibacterium species	PROBPRO
CITSPE	Propioniferax	PROF
CITWER	Propioniferax innocua	PROFINN
CITYOU	Proteus	PROT
CLO	Proteus mirabilis Proteus murafagiona	PROTMIR
CLOAMN	Proteus penneri	PROTPEN
CLOARG	Proteus species	PROTSPE
CLOAUR	Proteus vulgaris	PROTVUL
CLOBAR	Proteus vulgaris/penneri Protothega	PROTVULPEN
CLOBET	Prototheca wickerhamii	PROHWIC
CLOBOT	Prototheca zopfii	PROHZOP
CLOBUT	Providencia	PROV
CLOCAD	Providencia alcalifaciens	PROVALC
CLOCEL CLOCEL	Providencia nelmoacnae Providencia rettgeri	PROVPET PROVPET
CLOCEO	Providencia rustigianii	PROVRUS
CLOCHA	Providencia species	PROVSPE
CLOCLO	Providencia stuartii	PROVSTU
CLOCOH CLOCOL	Providencia stuartii urea+	PROVSTUUR
CLODIF	Pseudomonas aeruginosa	PSEAER
CLOFAL	Pseudomonas aeruginosa (CF)	PSEAERCF

Clostridium feisineum	CLOFEL		
Cleatridium chenii	CT OCUO	Pseudomonas alcaligenes Dacudomonas fluoroggong	PSEALC
Clostridium glucolicum	CLOGIV	Breudomonas fluorescens (putida	PSEFLU
Clostridium bacmoluticum	CLOGLI	Pseudomonas luteola	CUDMIUT
Clostridium haemolyticum	CLOHAE	Pseudomonas iuceoia	CHRMLUI
Clostridium hastilorme	CLOHAS	Pseudomonas mendocina	PSEMEN
Clostridium histolyticum	CLOHIS	Pseudomonas montelli	PSEMON
Clostridium indolis	CLOIND	Pseudomonas oryzinabitans	FLAIORY
Clostridium innocuum	CLOINN	Pseudomonas pertucinogena	PSEPER
Clostridium irregulare	CLOIRR	Pseudomonas pseudoalcaligenes	PSEPSE
Clostridium leptum	CLOLEP	Pseudomonas pseudoalcaligenes ssp pseudoalcali	gPSEPSEP
Clostridium limosum	CLOLIM	Pseudomonas putida	PSEPUT
Clostridium malenominatum	CLOMAL	Pseudomonas species	PSESPE
Clostridium mangenotii	CLOMAN	Pseudomonas stutzeri	PSESTU
Clostridium nexile	CLONEX	Pseudonocardia	PSEN
Clostridium nouvi	CLONOV	Pseudonocardia autotrophica	DSENAIIT
	CLONOV .	Pseudonocatuta aucocrophica	POERAUI
Clostridium novyi A	CLONOVA	Pseudoramibacter	PSER
Clostridium novyi B	CLONOVB	Pseudoramibacter alactolyticus	EUBALA
Clostridium oceanicum	CLOOCE	Psychrobacter	PSY
Clostridium orbiscindens	CLOORB	Psychrobacter immobilis	PSYIMM
Clostridium oroticum	CLOORO	Psychrobacter phenylpyruvicus	MORAPHE
Clostridium paraputrificum	CLOPAR	Rahnella	RAH
Clostridium perfringens	CLOPER	Rahnella aquatilis	RAHAOU
Clostridium putrefaciens	CLOPUR	Ralstonia	RAT.
Clostridium putrificum	CLOPIT	Ralstonia naugula	CDCTVC2
Clostridium ramogum	CLOPAM	Raisconia pickettii	DIDDIC
dlastaidium saudisisses	CLORAN	Raisconia pickettii bianan 1	DURPIC
clostridium sardiniense	CLOSAR	Raistonia pickettii biovar i	BURPICI
Clostridium sartagoiorme	CLOSAT	Raistonia pickettii biovar 2	BORPIC2
Clostridium scatologenes	CLOSCA	Ralstonia pickettii biovar 3	BURPIC3
Clostridium septicum	CLOSEP	Ralstonia solanacearum	BURSOL
Clostridium sordellii	CLOSOR	Rhodococcus	RHOC
Clostridium species	CLOSPE	Rhodococcus coprophilus	RHOCCOP
Clostridium sphenoides	CLOSPH	Rhodococcus equi	RHOCEOU
Clostridium spiroforme	CLOSPI	Rhodococcus ervthropolis	RHOCERY
Clostridium sporogenes	CLOSPO	Rhodococcus fascians	RHOCEAS
Clostridium sporosphaeroides	CLOSPS	Rhodococcus globerulus	RHOCCIAD
Clostridium subterminals	CLOSID	Phodogoggua rhodoghroug	DUCCDIO
Clostridium aumbioaum	CLOBUB	Rhodogoggug graging	DUOCCERU
CIOSCIIUIII SYMDIOSUM	CLUSIM	Rhoudcoccus species	RHOUSPE
Clostridium tertium	CLOTER	KNOQOTOTULA	RHOT
Clostridium tetani	CLOTET	Rhodotorula glutinis	RHOTGLU
Clostridium tyrobutyricum	CLOTYR	Rhodotorula mucilaginosa var mucilaginosa	RHOTMUC
Collinsella	COLL	Rhodotorula rubra	RHOTRUB
Collinsella aerofaciens	EUBAER	Rhodotorula species	RHOTSPE
Comamonas	COM	Rickettsia	RICK
Comemonas terrigena	COMTER	Rickettsia (Group)	RICKG
Comamonas testosteroni	COMTES	Riemerella	DIE
Comministras cescosceroni	CONTES	Dismonalla anatimatifan	DIDANA
coprococcus	COP	Riemerella analipestiler	RIEANA
Coprococcus catus	COPCAT	Rikenella	RIK
Coprococcus comes	COPCOM	Rikenella microfusus	RIKMIC
Coprococcus eutactus	COPEUT	Roseomonas	ROS
Corynebacterium	COR	Roseomonas cervicalis	ROSCER
Corynebacterium accolens	CORACC	Roseomonas fauriae	ROSFAU
Corynebacterium afermentans	CORAFE	Roseomonas gilardii	ROSGIL
Corynebacterium afermentans ssp aferment	aCORAFEA	Roseomonas species	ROSSPE
Corvnebacterium afermentans ssp lipophil	uCORAFEL	Rothia	ROT
Corvnebacterium amvcolatum	CORAMY	Rothia dentocariosa	ROTDEN
Corvebacterium amycolatum/miniticcimum	CORAMYMIN	Rothia mugilaginoga	STOMIC
Corynebacterium amycolatum/minicissimum	CORAMICER	Rothia macriaginosa Duminosossus	DIM
	CORAMISIR	Ruminococcus Duminococcus	RUM
corynebacterium argentoratense	CORARG	Ruminococcus albus	RUMALB
Corynebacterium auris	CORAUR	Ruminococcus bromii	RUMBRO
Corynebacterium bovis	CORBOV	Ruminococcus hansenii	STRHAN
Corynebacterium coyleae	CORCOY	Ruminococcus productus	RUMPRO
Corynebacterium cystitidis	CORCYS	Saccharomyces	SAC
Corynebacterium diphtheriae	CORDIP	Saccharomyces cerevisiae	SACCER
Corvnebacterium diphtheriae ssp belfanti	CORDIPB	Saccharomyces pastorianus	SACPAS
Corvnebacterium diphtheriae sep gravis	CORDIRG	Saccharomyces uvarum	SACINA
Corynebacterium diphtheriae gap intermed	CORDINI	Salmonella	CAL
	ICONDIFI	Calmonella abordeen	
Corynebacterium diphtheriae gap mitig	CODDIDM	Satilionetta aberueen	
Corynebacterium diphtheriae ssp mitis	CORDIPM		SALABE
Corynebacterium diphtheriae ssp mitis Corynebacterium durum	CORDIPM CORDUR	Salmonella abortus-equi	SALABE
Corynebacterium diphtheriae ssp mitis Corynebacterium durum Corynebacterium flavescens	CORDIPM CORDUR CORFLA	Salmonella abortus-equi Salmonella adelaide	SALABE SALABOE SALADL
Corynebacterium diphtheriae ssp mitis Corynebacterium durum Corynebacterium flavescens Corynebacterium flavescens	CORDIPM CORDUR CORFLA CORGEN	Salmonella abortus-equi Salmonella adelaide Salmonella aderike	SALABE SALABOE SALADL SALADR
Corynebacterium diphtheriae sop intermet Corynebacterium durum Corynebacterium flavescens Corynebacterium genitalium Corynebacterium genitalium	CORDIPM CORDUR CORFLA CORGEN CORGENI	Salmonella abortus-equi Salmonella adelaide Salmonella aderike Salmonella agona	SALABE SALABOE SALADL SALADR SALAGO
Corynebacterium diphtheriae ssp mitis Corynebacterium durum Corynebacterium flavescens Corynebacterium genitalium Corynebacterium genitalium biovar I Corynebacterium genitalium biovar II	CORDIPM CORDUR CORFLA CORGEN CORGENI CORGENII	Salmonella abortus-equi Salmonella adelaide Salmonella aderike Salmonella agona Salmonella alachua	SALABE SALABOE SALADL SALADR SALAGO SALALA
Corynebacterium diphtheriae sop mitis Corynebacterium durum Corynebacterium flavescens Corynebacterium genitalium Corynebacterium genitalium biovar I Corynebacterium genitalium biovar II Corynebacterium genitalium biovar III	CORDIPM CORDUR CORFLA CORGEN CORGENI CORGENII CORGENIII	Salmonella abortus-equi Salmonella adelaide Salmonella aderike Salmonella agona Salmonella alachua Salmonella anatum	SALABE SALABOE SALADL SALADR SALAGO SALALA SALANA
Corynebacterium diphtheriae ssp mitis Corynebacterium durum Corynebacterium flavescens Corynebacterium genitalium Corynebacterium genitalium biovar I Corynebacterium genitalium biovar II Corynebacterium genitalium biovar III Corynebacterium genitalium biovar IV	CORDIPM CORDUR CORFLA CORGENI CORGENII CORGENIII CORGENIII CORGENIV	Salmonella abortus-equi Salmonella adelaide Salmonella aderike Salmonella agona Salmonella alachua Salmonella anatum Salmonella arizonae	SALABE SALABOE SALADL SALADR SALAGO SALALA SALANA SALARI
Corynebacterium diphtheriae sop mitis Corynebacterium diphtheriae sop mitis Corynebacterium flavescens Corynebacterium genitalium Corynebacterium genitalium biovar I Corynebacterium genitalium biovar III Corynebacterium genitalium biovar III Corynebacterium genitalium biovar V	CORDIPM CORDUR CORFLA CORGEN CORGENI CORGENII CORGENII CORGENIV CORGENV	Salmonella abortus-equi Salmonella adelaide Salmonella aderike Salmonella agona Salmonella alachua Salmonella anatum Salmonella arizonae Salmonella ayana	SALABE SALABOE SALADL SALADR SALAGO SALALA SALANA SALANA SALANI SALAVA
Corynebacterium diphtheriae ssp mitis Corynebacterium diphtheriae ssp mitis Corynebacterium flavescens Corynebacterium genitalium Corynebacterium genitalium biovar I Corynebacterium genitalium biovar II Corynebacterium genitalium biovar IV Corynebacterium genitalium biovar V Corynebacterium genitalium biovar V	CORDIPM CORFLA CORFLA CORGENI CORGENII CORGENII CORGENIU CORGENVI CORGENVI	Salmonella abortus-equi Salmonella adelaide Salmonella aderike Salmonella agona Salmonella anatum Salmonella anizonae Salmonella avana Salmonella bahrenfeld	SALABE SALABOE SALADL SALADR SALAGO SALALA SALANA SALARI SALAVA SALBAH
Corynebacterium diphtheriae sop mitis Corynebacterium diphtheriae sop mitis Corynebacterium flavescens Corynebacterium genitalium Corynebacterium genitalium biovar II Corynebacterium genitalium biovar III Corynebacterium genitalium biovar IV Corynebacterium genitalium biovar V Corynebacterium genitalium biovar VI Corynebacterium genitalium biovar VI	CORDIPM CORDUR CORFLA CORGEN CORGENI CORGENII CORGENIII CORGENIV CORGENV CORGENVI CORGENVI CORGIC	Salmonella abortus-equi Salmonella adelaide Salmonella aderike Salmonella agona Salmonella alachua Salmonella anatum Salmonella arizonae Salmonella barenfeld Salmonella bhorenfeld	SALABE SALADL SALADL SALADR SALAGO SALALA SALANA SALANA SALAVA SALBAH SAJ.BLO
Corynebacterium diphtheriae ssp mitis Corynebacterium diphtheriae ssp mitis Corynebacterium flavescens Corynebacterium genitalium biovar I Corynebacterium genitalium biovar II Corynebacterium genitalium biovar III Corynebacterium genitalium biovar VI Corynebacterium genitalium biovar VI	CORDIPM CORDUR CORPLA CORGEN CORGENI CORGENII CORGENII CORGENIV CORGENV CORGENV CORGLC CORTMI	Salmonella abortus-equi Salmonella adelaide Salmonella aderike Salmonella agona Salmonella alachua Salmonella anatum Salmonella arizonae Salmonella bahrenfeld Salmonella blockley Salmonella bonori	SALABEE SALADC SALADC SALADC SALACO SALACO SALACA SALBAC SALBOM
Corynebacterium diphtheriae ssp mitis Corynebacterium diphtheriae ssp mitis Corynebacterium flavescens Corynebacterium genitalium Corynebacterium genitalium biovar I Corynebacterium genitalium biovar II Corynebacterium genitalium biovar IV Corynebacterium genitalium biovar V Corynebacterium genitalium biovar V Corynebacterium genitalium biovar VI Corynebacterium glucuronolyticum Corynebacterium imitans Corynebacterium imitans	CORDIPM CORDUR CORFLA CORGEN CORGENI CORGENII CORGENIV CORGENV CORGENVI CORGENVI CORGELC CORIMI CORDEL	Salmonella abortus-equi Salmonella adelaide Salmonella aderike Salmonella agona Salmonella alachua Salmonella anatum Salmonella arizonae Salmonella avana Salmonella bahrenfeld Salmonella blockley Salmonella bongori	SALABE SALADC SALADC SALADC SALACO SALACO SALACA SALANA SALANA SALBON SALBON SALBON
Corynebacterium diphtheriae ssp mitis Corynebacterium diphtheriae ssp mitis Corynebacterium flavescens Corynebacterium genitalium biovar I Corynebacterium genitalium biovar II Corynebacterium genitalium biovar III Corynebacterium genitalium biovar VI Corynebacterium jeikeium Corynebacterium jeikeium	CORDIPM CORDUR CORPLA CORGEN CORGENI CORGENII CORGENII CORGENIV CORGENV CORGENV CORGLC CORIMI CORJEI CORJEI	Salmonella abortus-equi Salmonella adelaide Salmonella aderike Salmonella agona Salmonella alachua Salmonella anatum Salmonella arizonae Salmonella avana Salmonella bhorchey Salmonella bockley Salmonella braenderup	SALABDE SALABOE SALADC SALADR SALAGO SALALA SALAVA SALBAH SALBAN SALBAN SALBRA
Corynebacterium diphtheriae ssp mitis Corynebacterium diphtheriae ssp mitis Corynebacterium flavescens Corynebacterium genitalium Corynebacterium genitalium biovar I Corynebacterium genitalium biovar II Corynebacterium genitalium biovar IV Corynebacterium genitalium biovar V Corynebacterium genitalium biovar V Corynebacterium genitalium biovar V Corynebacterium genitalium biovar V Corynebacterium genitalium biovar VI Corynebacterium genitalium biovar VI Corynebacterium genitalium biovar VI Corynebacterium genitalium biovar VI Corynebacterium jeikeium Corynebacterium imitans	CORDIPM CORDUR CORFLA CORGEN CORGENI CORGENII CORGENIV CORGENIV CORGENVI CORGELVI CORGLC CORIMI CORAUT CORAUT	Salmonella abortus-equi Salmonella aderike Salmonella aderike Salmonella aderike Salmonella alachua Salmonella anatum Salmonella arizonae Salmonella avana Salmonella bahrenfeld Salmonella bolckley Salmonella bongori Salmonella brednerup Salmonella brednerup	SALABOE SALABOE SALADR SALAQR SALAQO SALAQA SALARI SALAVA SALBAN SALBAN SALBRA SALBRA
Corynebacterium diphtheriae ssp mitis Corynebacterium diphtheriae ssp mitis Corynebacterium flavescens Corynebacterium genitalium biovar I Corynebacterium genitalium biovar II Corynebacterium genitalium biovar III Corynebacterium genitalium biovar III Corynebacterium genitalium biovar VI Corynebacterium genitalium biovar V Corynebacterium genitalium biovar VI Corynebacterium jeikeium Corynebacterium initans Corynebacterium hutscheri Corynebacterium macginleyi	CORDIPM CORDUR CORFLA CORGEN CORGENI CORGENII CORGENII CORGENIV CORGENVI CORGENVI CORGENVI CORGIC CORJEI CORJEI CORNEC CORMAC	Salmonella abortus-equi Salmonella adelaide Salmonella aderike Salmonella agona Salmonella alachua Salmonella anatum Salmonella anatum Salmonella avana Salmonella bahrenfeld Salmonella blockley Salmonella braenderup Salmonella braenderup Salmonella braenderup	SALABDE SALABOE SALADC SALADR SALAGO SALALA SALARI SALAVA SALBAH SALBON SALBON SALBRE SALBUR SALBRE
Corynebacterium diphtheriae ssp mitis Corynebacterium diphtheriae ssp mitis Corynebacterium flavescens Corynebacterium genitalium Corynebacterium genitalium biovar I Corynebacterium genitalium biovar II Corynebacterium genitalium biovar IV Corynebacterium genitalium biovar V Corynebacterium genitalium biovar V Corynebacterium genitalium biovar VI Corynebacterium filtans Corynebacterium imitans Corynebacterium kutscheri Corynebacterium macginleyi Corynebacterium matruchotii	CORDIPM CORDUR CORFLA CORGEN CORGENI CORGENII CORGENIV CORGENIV CORGENVI CORGLC CORIMI CORJEI CORUT CORKUT CORMAC CORMAT	Salmonella abortus-equi Salmonella aderike Salmonella aderike Salmonella adorike Salmonella alachua Salmonella anatum Salmonella arizonae Salmonella arizonae Salmonella bhrenfeld Salmonella bhorgori Salmonella bredeney Salmonella bredeney Salmonella bredeney Salmonella bredeney Salmonella california	SALABDE SALABOE SALADC SALADC SALACO SALACA SALANA SALANA SALBAH SALBAN SALBAN SALBRA SALBUN SALCAL
Corynebacterium diphtheriae sop mitis Corynebacterium diphtheriae sop mitis Corynebacterium flavescens Corynebacterium genitalium Corynebacterium genitalium biovar II Corynebacterium genitalium biovar III Corynebacterium genitalium biovar VI Corynebacterium genitalium biovar V Corynebacterium genitalium biovar V Corynebacterium glucuronolyticum Corynebacterium glucuronolyticum Corynebacterium jeikeium Corynebacterium imitans Corynebacterium kutscheri Corynebacterium matruchotii Corynebacterium matruchotii	CORDIPM CORDUR CORFLA CORGENI CORGENI CORGENII CORGENII CORGENIV CORGENV CORGENV CORGENV CORGENV CORJEI CORJEI CORMAC CORMAT CORMAT CORMIN	Salmonella abortus-equi Salmonella adelaide Salmonella aderike Salmonella agona Salmonella alachua Salmonella anatum Salmonella anatum Salmonella avana Salmonella bahrenfeld Salmonella bongori Salmonella braenderup Salmonella braenderup Salmonella braenderup Salmonella braenderup Salmonella braenderup Salmonella bunn Salmonella caifornia	SALABDE SALABOE SALADL SALADR SALAGO SALALA SALARI SALARI SALBAH SALBAN SALBAN SALBAN SALBRA SALBUN SALBUN SALCAL SALCAR
Corynebacterium diphtheriae ssp mitis Corynebacterium diphtheriae ssp mitis Corynebacterium flavescens Corynebacterium genitalium biovar I Corynebacterium genitalium biovar II Corynebacterium genitalium biovar II Corynebacterium genitalium biovar IV Corynebacterium genitalium biovar V Corynebacterium genitalium biovar V Corynebacterium genitalium biovar VI Corynebacterium imitans Corynebacterium imitans Corynebacterium macginleyi Corynebacterium macginleyi Corynebacterium matruchotii Corynebacterium miufisalmum Corynebacterium mucifaciens	CORDIPM CORDUR CORPLA CORGENI CORGENI CORGENII CORGENIU CORGENIU CORGENVI CORGLC CORIMI CORJEI CORKUT CORMAC CORMAT CORMIN CORMUC	Salmonella abortus-equi Salmonella aderike Salmonella aderike Salmonella adorike Salmonella alachua Salmonella anatum Salmonella arizonae Salmonella avana Salmonella bahrenfeld Salmonella borgori Salmonella bredeney Salmonella bredeney Salmonella bredeney Salmonella carrau Salmonella carrau	SALABDE SALABOE SALADC SALADC SALACO SALALA SALANA SALANA SALBAN SALBAN SALBAN SALBRE SALBUN SALCAR SALCAR SALCER
Corynebacterium diphtheriae ssp mitis Corynebacterium diphtheriae ssp mitis Corynebacterium flavescens Corynebacterium genitalium Corynebacterium genitalium biovar II Corynebacterium genitalium biovar II Corynebacterium genitalium biovar IV Corynebacterium genitalium biovar V Corynebacterium genitalium biovar V Corynebacterium glucuronolyticum Corynebacterium jeikeium Corynebacterium imitans Corynebacterium kutscheri Corynebacterium matruchotii Corynebacterium matruchotii Corynebacterium minutissimum Corynebacterium mucifaciens Corynebacterium mucifaciens	CORDIPM CORDUR CORFLA CORGENI CORGENI CORGENII CORGENIII CORGENIV CORGENV CORGENV CORGENV CORGENV CORGENV CORMAT CORMAT CORMIN CORMUC CORMUC	Salmonella abortus-equi Salmonella adelaide Salmonella aderike Salmonella agona Salmonella alachua Salmonella anatum Salmonella anatum Salmonella avana Salmonella bahrenfeld Salmonella bongori Salmonella braenderup Salmonella braenderup Salmonella braenderup Salmonella braenderup Salmonella braenderup Salmonella carrau Salmonella carrau Salmonella carrau	SALABDE SALABOE SALABOE SALADR SALADR SALAAR SALARA SALARA SALARA SALBAH SALBAH SALBRA SALBRA SALBRA SALBRA SALCAL SALCAR SALCER SALCHA
Corynebacterium diphtheriae ssp mitis Corynebacterium diphtheriae ssp mitis Corynebacterium flavescens Corynebacterium genitalium biovar I Corynebacterium genitalium biovar II Corynebacterium genitalium biovar II Corynebacterium genitalium biovar IV Corynebacterium genitalium biovar V Corynebacterium flatas Corynebacterium macginleyi Corynebacterium macginleyi Corynebacterium mucifaciens Corynebacterium mucifaciens Corynebacterium mucifaciens	CORDIPM CORDUR CORPLA CORGENI CORGENI CORGENII CORGENII CORGENIV CORGENV CORGENV CORGLC CORJEI CORKUT CORKUT CORMAC CORMAT CORMIN CORMUC CORMYC CORMYC CORMYC	Salmonella abortus-equi Salmonella aderike Salmonella aderike Salmonella adorike Salmonella alachua Salmonella anatum Salmonella arizonae Salmonella avana Salmonella bahrenfeld Salmonella bokkey Salmonella bredeney Salmonella bredeney Salmonella bredeney Salmonella cariau Salmonella carrau Salmonella carrau Salmonella cerro Salmonella champaign	SALABE SALABE SALADI SALADI SALADI SALADI SALADI SALADI SALANA SALBAH SALBAN SALBRA SALBRA SALBRA SALCAI SALCAI SALCAI
Corynebacterium diphtheriae ssp mitis Corynebacterium diphtheriae ssp mitis Corynebacterium flavescens Corynebacterium genitalium Corynebacterium genitalium biovar II Corynebacterium genitalium biovar II Corynebacterium genitalium biovar IV Corynebacterium genitalium biovar V Corynebacterium genitalium biovar V Corynebacterium genitalium biovar V Corynebacterium glouronolyticum Corynebacterium glouronolyticum Corynebacterium mitans Corynebacterium imitans Corynebacterium kutscheri Corynebacterium matruchotii Corynebacterium matruchotii Corynebacterium minutissimum Corynebacterium mucifaciens Corynebacterium mycetoides Corynebacterium propinguum	CORDIPM CORDUR CORFLA CORGENI CORGENI CORGENII CORGENII CORGENIV CORGENVI CORGENVI CORGENVI CORGENVI CORGENVI CORGENVI CORMAC CORMAC CORMAT CORMIN CORMUC CORMUC CORPIL CORPIL CORPEN	Salmonella abortus-equi Salmonella adelaide Salmonella aderike Salmonella agona Salmonella alachua Salmonella anatum Salmonella anatum Salmonella avana Salmonella bahrenfeld Salmonella bongori Salmonella bongori Salmonella braenderup Salmonella braenderup Salmonella bunn Salmonella carrau Salmonella carrau Salmonella carrau Salmonella chittagong Salmonella chittagong	SALABE SALABE SALADI SALACI SALACI SALACI SALATA SALATI SALATI SALBON SALBON SALBON SALEN SALCAR SALCAR SALCHI SALCHI SALCHI
Corynebacterium diphtheriae ssp mitis Corynebacterium diphtheriae ssp mitis Corynebacterium flavescens Corynebacterium genitalium Corynebacterium genitalium biovar I Corynebacterium genitalium biovar II Corynebacterium genitalium biovar II Corynebacterium genitalium biovar VI Corynebacterium findissi Corynebacterium macginleyi Corynebacterium macginleyi Corynebacterium mucifaciens Corynebacterium mucifaciens Corynebacterium pilosum Corynebacterium pseudodibtheriticum	CORDIPM CORDUR CORPLA CORGENI CORGENI CORGENII CORGENII CORGENIV CORGENVI CORGENVI CORGLC CORIMI CORJEI CORMAT CORMAT CORMAT CORMUN CORMUN CORMUN CORMUN CORMUN CORMUN CORMUN CORPED	Salmonella abortus-equi Salmonella aderike Salmonella aderike Salmonella adorike Salmonella adotua Salmonella anatum Salmonella arizonae Salmonella avana Salmonella bahrenfeld Salmonella bockley Salmonella bredeney Salmonella bredeney Salmonella bredeney Salmonella bredeney Salmonella california Salmonella carau Salmonella carro Salmonella champaign Salmonella chitagong Salmonella choleraesuis	SALABE SALADE SALADI SALADI SALADI SALADI SALADI SALADI SALADI SALADI SALBA SALBA SALBRA SALBRA SALER SALCAL SALCHA SALCHO SALCHO
Corynebacterium diphtheriae ssp mitis Corynebacterium diphtheriae ssp mitis Corynebacterium flavescens Corynebacterium genitalium Corynebacterium genitalium biovar II Corynebacterium genitalium biovar III Corynebacterium genitalium biovar IV Corynebacterium genitalium biovar V Corynebacterium mitians Corynebacterium mitians Corynebacterium matruchotii Corynebacterium matruchotii Corynebacterium mucifaciens Corynebacterium mycetoides Corynebacterium propinquum Corynebacterium propinquum Corynebacterium pesudocenitalium	CORDIPM CORDUR CORFLA CORGEN CORGENI CORGENII CORGENII CORGENIV CORGENVI CORGENVI CORGENVI CORGENVI CORGENVI CORGENVI CORMAC CORMAC CORMAC CORMIN CORMIN CORMUC CORPIL CORPED CORPEG	Salmonella abortus-equi Salmonella adelaide Salmonella aderike Salmonella agona Salmonella alachua Salmonella anatum Salmonella anatum Salmonella avana Salmonella bahrenfeld Salmonella bongori Salmonella bongori Salmonella borgori Salmonella braenderup Salmonella braenderup Salmonella bunn Salmonella carrau Salmonella carrau Salmonella carrau Salmonella chittagong Salmonella choleraesuis sparizonae Salmonella choleraesuis sparizonae	SALABO SALABO SALADL SALADL SALADL SALADA SALAGO SALALA SALARI SALANA SALBAH SALBAN SALBAN SALBAN SALBAN SALCAR SALCHA SALCHO SALCHOA
Corynebacterium diphtheriae ssp mitis Corynebacterium diphtheriae ssp mitis Corynebacterium flavescens Corynebacterium genitalium biovar I Corynebacterium genitalium biovar II Corynebacterium genitalium biovar II Corynebacterium genitalium biovar VI Corynebacterium jeikeium Corynebacterium macginleyi Corynebacterium macginleyi Corynebacterium macginleyi Corynebacterium minutissimum Corynebacterium mycetoides Corynebacterium pilosum Corynebacterium pseudodiphtheriticum Corynebacterium pseudogenitalium biovar	CORDIPM CORDUR CORPLA CORGENI CORGENI CORGENII CORGENII CORGENIV CORGENVI CORGENVI CORGLC CORJEI CORKUT CORMUT CORMUT CORMUT CORMUT CORMUT CORMUT CORMUT CORMUT CORMUT CORMUT CORMUT CORPC CORPSD CORPSD CORPSGC	Salmonella abortus-equi Salmonella adelaide Salmonella aderike Salmonella agona Salmonella alachua Salmonella anatum Salmonella anatum Salmonella anatum Salmonella avana Salmonella bahrenfeld Salmonella bockley Salmonella braenderup Salmonella braenderup Salmonella braenderup Salmonella california Salmonella carrau Salmonella cerro Salmonella chitagong Salmonella choleraesuis sep arizonae Salmonella choleraesuis sep choleraesuis Salmonella choleraesuis sep choleraesuis	SALABE SALABE SALADI SALADI SALARI SALARI SALARI SALARI SALARI SALBA SALBRA SALBRA SALBRA SALBRA SALCAI SALCAI SALCHO SALCHO SALCHOC
Corynebacterium diphtheriae ssp mitis Corynebacterium diphtheriae ssp mitis Corynebacterium flavescens Corynebacterium genitalium Corynebacterium genitalium biovar I Corynebacterium genitalium biovar II Corynebacterium genitalium biovar IV Corynebacterium genitalium biovar V Corynebacterium jeikeium Corynebacterium jeikeium Corynebacterium matruchotii Corynebacterium matruchotii Corynebacterium mucifaciens Corynebacterium mucifaciens Corynebacterium piosum Corynebacterium piosum Corynebacterium proginquum Corynebacterium peeudogenitalium Corynebacterium peeudogenitalium biovar Corynebacterium peeudogenitalium biovar	CORDIPM CORDUR CORFLA CORGEN CORGENI CORGENII CORGENII CORGENIV CORGENIV CORGENV CORGENV CORGENV CORGENV CORGENV CORGENV CORGENV CORMAT CORMAT CORMAT CORMIN CORMUC CORMIC CORPED CORPEG CORPEG CORPEGC2	Salmonella abortus-equi Salmonella aderike Salmonella aderike Salmonella aderike Salmonella adachua Salmonella anatum Salmonella anatum Salmonella avana Salmonella bahrenfeld Salmonella bongori Salmonella bongori Salmonella bredeney Salmonella bredeney Salmonella bredeney Salmonella carrau Salmonella carrau Salmonella chitagong Salmonella chitagong Salmonella choleraesuis ssp arizonae Salmonella choleraesuis ssp diarizonae Salmonella choleraesuis ssp diarizonae	SALABO SALABO SALADI SALADI SALADI SALADA SALAGO SALAGO SALARI SALARI SALBAN SALBAN SALBAN SALBRA SALBRA SALCAR SALCHO SALCHO SALCHOO SALCHOO
Corynebacterium diphtheriae ssp mitis Corynebacterium diphtheriae ssp mitis Corynebacterium flavescens Corynebacterium genitalium biovar I Corynebacterium genitalium biovar II Corynebacterium genitalium biovar II Corynebacterium genitalium biovar VI Corynebacterium mecinolyticum Corynebacterium initans Corynebacterium macginleyi Corynebacterium matruchotii Corynebacterium matruchotii Corynebacterium minutissimum Corynebacterium mycetoides Corynebacterium pilosum Corynebacterium pilosum Corynebacterium pseudogenitalium Corynebacterium pseudogenitalium biovar Corynebacterium pseudogenitalium biovar	CORDIPM CORDUR CORPLA CORGENI CORGENI CORGENII CORGENII CORGENIV CORGENVI CORGENVI CORGLC CORJEI CORJEI CORMAT CORMAT CORMAT CORMIN CORMUC CORMIN CORPLI CORPC CORPSD CORPSGC1 CCORPSGC2	Salmonella abortus-equi Salmonella adelaide Salmonella aderike Salmonella agona Salmonella alachua Salmonella anatum Salmonella anatum Salmonella avizonae Salmonella avizonae Salmonella bahrenfeld Salmonella bongori Salmonella braenderup Salmonella braenderup Salmonella braenderup Salmonella braenderup Salmonella carifornia Salmonella carifornia Salmonella carrau Salmonella carrau Salmonella chitagong Salmonella choleraesuis ssp arizonae Salmonella choleraesuis ssp choleraesuis Salmonella choleraesuis ssp houtenae	SALABE SALABE SALADI SALADI SALADI SALANG SALANA SALARI SALANA SALBAH SALBAH SALBAH SALBRA SALBRA SALCHI SALCHI SALCHO SALCHOD SALCHOH SALCHOH
Corynebacterium diphtheriae ssp mitis Corynebacterium diphtheriae ssp mitis Corynebacterium flavescens Corynebacterium genitalium biovar I Corynebacterium genitalium biovar II Corynebacterium genitalium biovar II Corynebacterium genitalium biovar IV Corynebacterium genitalium biovar V Corynebacterium macginleyi Corynebacterium matruchotii Corynebacterium mucifaciens Corynebacterium mucifaciens Corynebacterium pilosum Corynebacterium pilosum Corynebacterium pseudogenitalium Corynebacterium pseudogenitalium biovar Corynebacterium pseudogenitalium biovar	CORDIPM CORDUR CORFLA CORGEN CORGENI CORGENII CORGENII CORGENIV CORGENIV CORGENV CORGENV CORGENV CORGENV CORGENV CORGENV CORGENV CORMAC CORMAC CORMAC CORMAC CORMIN CORMIC CORMIC CORPSG CORPSG CORPSG CORPSGC2 CORPSGC2	Salmonella abortus-equi Salmonella aderike Salmonella aderike Salmonella aderike Salmonella adachua Salmonella anatum Salmonella anatum Salmonella arizonae Salmonella avana Salmonella bahrenfeld Salmonella bongori Salmonella bongori Salmonella brednerup Salmonella brednerup Salmonella brednerup Salmonella brednerup Salmonella carrau Salmonella carrau Salmonella carrau Salmonella chitagong Salmonella choleraesuis Salmonella choleraesuis Salmonella choleraesuis ssp arizonae Salmonella choleraesuis ssp diarizonae Salmonella choleraesuis ssp diarizonae Salmonella choleraesuis ssp diarizonae Salmonella choleraesuis ssp indica	SALABO SALABO SALADI SALADI SALADI SALADA SALAGO SALAGO SALARI SALARI SALBAN SALBAN SALBAN SALBRA SALCHA SALCHO SALCHOI SALCHOI
Corynebacterium diphtheriae ssp mitis Corynebacterium diphtheriae ssp mitis Corynebacterium flavescens Corynebacterium genitalium biovar I Corynebacterium genitalium biovar II Corynebacterium genitalium biovar III Corynebacterium genitalium biovar VI Corynebacterium denitalium biovar VI Corynebacterium minitas Corynebacterium minitas Corynebacterium macginleyi Corynebacterium matruchotii Corynebacterium minutissimum Corynebacterium minutissimum Corynebacterium pilosum Corynebacterium pilosum Corynebacterium pseudogenitalium biovar Corynebacterium pseudogenitalium biovar Corynebacterium pseudogenitalium biovar Corynebacterium pseudogenitalium biovar	CORDIPM CORDUR CORFLA CORGENI CORGENI CORGENII CORGENII CORGENIV CORGENVI CORGENVI CORGENVI CORGENV CORGENV CORMAC CORMAC CORMAC CORMIN CORMUC CORPIL CORPIL CORPSD CORPSG CORPSGC1 CCORPSGC3	Salmonella abortus-equi Salmonella adelaide Salmonella aderike Salmonella agona Salmonella alachua Salmonella anatum Salmonella anatum Salmonella avizonae Salmonella avizonae Salmonella bahrenfeld Salmonella bongori Salmonella bongori Salmonella braenderup Salmonella braenderup Salmonella braenderup Salmonella braenderup Salmonella cariconia Salmonella cariconia Salmonella cariconia Salmonella cariconia Salmonella cariconia Salmonella chitagong Salmonella choleraesuis ssp arizonae Salmonella choleraesuis ssp dicaesuis Salmonella choleraesuis ssp houtenae Salmonella choleraesuis ssp indica Salmonella choleraesuis ssp salamae	SALABOE SALADE SALADI SALADI SALADI SALADI SALANA SALARI SALANA SALARI SALANA SALBAH SALBAD SALBRA SALBRA SALCRA SALCRA SALCHO SALCHOI SALCHOI SALCHOI SALCHOI SALCHOI SALCHOI
Corynebacterium diphtheriae ssp mitis Corynebacterium diphtheriae ssp mitis Corynebacterium flavescens Corynebacterium genitalium biovar I Corynebacterium genitalium biovar II Corynebacterium genitalium biovar II Corynebacterium genitalium biovar VI Corynebacterium mitians Corynebacterium macginleyi Corynebacterium macginleyi Corynebacterium matruchotii Corynebacterium mucifaciens Corynebacterium mucifaciens Corynebacterium pilosum Corynebacterium propinquum Corynebacterium pseudogenitalium biovar Corynebacterium pseudogenitalium biovar	CORDIPM CORDUR CORFLA CORGEN CORGENI CORGENII CORGENII CORGENIV CORGENIV CORGENV CORGENV CORGENV CORGENV CORGENV CORGENV CORMAT CORMAT CORMAT CORMIN CORMUC CORPIL CORPIL CORPSG CORPSG CORPSG CCORPSG CCORPSG CCORPSGC2 CCORPSGC4 CORPST	Salmonella abortus-equi Salmonella aderike Salmonella aderike Salmonella aderike Salmonella adachua Salmonella anatum Salmonella anatum Salmonella arizonae Salmonella bahrenfeld Salmonella bongori Salmonella bongori Salmonella bredeney Salmonella bunn Salmonella bunn Salmonella carrau Salmonella carrau Salmonella carrau Salmonella chitagong Salmonella choleraesuis Salmonella choleraesuis ssp arizonae Salmonella choleraesuis ssp diarizonae Salmonella choleraesuis ssp diarizonae Salmonella choleraesuis ssp indica Salmonella choleraesuis ssp indica Salmonella choleraesuis ssp salamae Salmonella choleraesuis ssp salamae	SALABE SALABE SALADE SALADE SALADE SALADA SALAAG SALAAG SALARI SALARI SALBAN SALBAN SALBAN SALBAN SALCHA SALCHA SALCHO SALCHOI
Corynebacterium diphtheriae ssp mitis Corynebacterium diphtheriae ssp mitis Corynebacterium genitalium Corynebacterium genitalium biovar I Corynebacterium genitalium biovar II Corynebacterium genitalium biovar II Corynebacterium genitalium biovar VI Corynebacterium genitalium biovar V Corynebacterium minitas Corynebacterium minitas Corynebacterium macginleyi Corynebacterium matruchotii Corynebacterium minutissimum Corynebacterium minutissimum Corynebacterium pilosum Corynebacterium pseudogenitalium biovar Corynebacterium pseudogenitalium biovar	CORDIPM CORDUR CORFLA CORGENI CORGENI CORGENII CORGENII CORGENIV CORGENVI CORGENVI CORGENVI CORGENV CORGENV CORMAC CORMAC CORMAC CORMAC CORMIN CORMUC CORPIL CORPED CORPESD CORPESD CCORPESC CCO	Salmonella abortus-equi Salmonella adelaide Salmonella aderike Salmonella agona Salmonella alachua Salmonella anatum Salmonella anatum Salmonella avizonae Salmonella bahrenfeld Salmonella bharenfeld Salmonella bongori Salmonella braenderup Salmonella braenderup Salmonella braenderup Salmonella braenderup Salmonella caridoria Salmonella caridoria Salmonella caridoria Salmonella caridoria Salmonella caridoria Salmonella chitagong Salmonella choleraesuis sparizonae Salmonella choleraesuis sparizonae Salmonella choleraesuis spo tholeraesuis Salmonella choleraesuis spo houtenae Salmonella choleraesuis spo houtenae Salmonella choleraesuis spo houtenae Salmonella choleraesuis spo salamae Salmonella choleraesuis spo salamae	SALABO SALABO SALADL SALADL SALADL SALADA SALAARI SALANA SALARI SALANA SALBAH SALBAN SALBAN SALBRA SALCR SALCR SALCR SALCRA SALCHO
Corynebacterium diphtheriae ssp mitis Corynebacterium diphtheriae ssp mitis Corynebacterium flavescens Corynebacterium genitalium biovar I Corynebacterium genitalium biovar II Corynebacterium genitalium biovar II Corynebacterium genitalium biovar VI Corynebacterium jeikeium Corynebacterium jeikeium Corynebacterium macginleyi Corynebacterium matruchotii Corynebacterium mucifaciens Corynebacterium mucifaciens Corynebacterium pilosum Corynebacterium pilosum Corynebacterium pseudogenitalium biovar Corynebacterium pseudogenitalium biovar	CORDIPM CORDIP CORPLA CORGENI CORGENI CORGENII CORGENII CORGENVI CORGENVI CORGENVI CORGLC CORJEI CORJEI CORMAT CORMAT CORMAT CORMIN CORMUC CORMYC CORPSD CORPSD CORPSGC1 CCORPSGC2 CCORPSGC2 CCORPSGC2 CORPSGC4 CORPST CORRENGR	Salmonella abortus-equi Salmonella aderike Salmonella aderike Salmonella aderike Salmonella adorike Salmonella adochua Salmonella anatum Salmonella arizonae Salmonella arizonae Salmonella bahrenfeld Salmonella bherefeld Salmonella bongori Salmonella bredeney Salmonella bredeney Salmonella bredeney Salmonella bredeney Salmonella carrau Salmonella carrau Salmonella carrau Salmonella chempaign Salmonella choleraesuis ssp arizonae Salmonella choleraesuis ssp diarizonae Salmonella choleraesuis ssp diarizonae Salmonella choleraesuis ssp indica Salmonella choleraesuis ssp indica Salmonella choleraesuis ssp salamae Salmonella dakar	SALABO SALABO SALADI SALADI SALADI SALADA SALADA SALARI SALANA SALARI SALBAN SALBAN SALBRA SALBRA SALCHA SALCHA SALCHO SALCHOI
Corynebacterium diphtheriae ssp mitis Corynebacterium diphtheriae ssp mitis Corynebacterium flavescens Corynebacterium genitalium biovar I Corynebacterium genitalium biovar II Corynebacterium genitalium biovar III Corynebacterium genitalium biovar VI Corynebacterium minitass Corynebacterium minitass Corynebacterium macginleyi Corynebacterium minitissimum Corynebacterium minitissimum Corynebacterium mycetoides Corynebacterium pilosum Corynebacterium pseudogenitalium biovar Corynebacterium renale Corynebacterium renale group	CORDIPM CORDUR CORPLA CORGENI CORGENI CORGENII CORGENII CORGENIV CORGENV CORGENV CORGENV CORGENV CORGENV CORJEI CORMAC CORMAC CORMAC CORMAC CORMIN CORMUC CORPIL CORPSG CORPSG CORPSG CORPSGC1 CCORPSGC1 CCORPSGC1 CCORPSGC2 CCORPSGC3 CORPSGC4 CORPST CORPST CORRENG CORRENC	Salmonella abortus-equi Salmonella adelaide Salmonella aderike Salmonella adorike Salmonella alachua Salmonella anatum Salmonella anatum Salmonella anatum Salmonella avana Salmonella bahrenfeld Salmonella bongori Salmonella bongori Salmonella bongori Salmonella bongori Salmonella braenderup Salmonella bunn Salmonella carrau Salmonella carrau Salmonella carrau Salmonella chittagong Salmonella choleraesuis ssp arizonae Salmonella choleraesuis Salmonella choleraesuis ssp diarizonae Salmonella choleraesuis ssp houtenae Salmonella choleraesuis ssp slamae Salmonella choleraesuis ssp slamae Salmonella choleraesuis ssp salamae Salmonella choleraesuis ssp salamae	SALABO SALABO SALADI SALADI SALADI SALADI SALADA SALARI SALANA SALARI SALBAN SALBAN SALBAN SALBAN SALBRA SALCR SALCRN SALCHO
Corynebacterium diphtheriae ssp mitis Corynebacterium diphtheriae ssp mitis Corynebacterium flavescens Corynebacterium genitalium biovar I Corynebacterium genitalium biovar II Corynebacterium genitalium biovar II Corynebacterium genitalium biovar VI Corynebacterium jeikeium Corynebacterium macginleyi Corynebacterium matruchotii Corynebacterium mucifaciens Corynebacterium mucifaciens Corynebacterium pilosum Corynebacterium pseudogenitalium biovar Corynebacterium renale Corynebacterium renale group Corynebacterium renale group Corynebacterium seuingenitalium biovar	CORDIPM CORDIP CORPLA CORGENI CORGENI CORGENII CORGENII CORGENIV CORGENVI CORGENVI CORGLC CORGLC CORJEI CORJEI CORVIT CORMAC CORMAC CORMAC CORMIN CORMUC CORMIN CORMUC CORPSD CORPSD CORPSG CCORPSGC1 CCORPSGC2 CCORPSGC2 CCORPSGC2 CCORPSGC2 CCORPSGC2 CORPSGC2 CCORPSGC2 CORPSGC2 CORPSGC2 CORPSGC2 CORPSGC2 CORPSGC2 CORPSGC4 CORPST CORRENGR CORRENGR CORRENGR CORRIE CORRENC CORRENC CORRENC CORRENC CORRENC CORRENC CORRENC CORRENC CORRESC CORRESC CORRENC CORRENC CORRENC CORRENC CORRENC CORRENC CORRENC CORRENC CORRENC CORRENC CORRENC CORRENC CORRESC CORREN	Salmonella abortus-equi Salmonella aderike Salmonella aderike Salmonella aderike Salmonella adachua Salmonella anatum Salmonella anitum Salmonella arizonae Salmonella avana Salmonella bahrenfeld Salmonella bongori Salmonella bredeney Salmonella bredeney Salmonella bredeney Salmonella bredeney Salmonella bredeney Salmonella carrau Salmonella carrau Salmonella chempaign Salmonella choleraesuis ssp arizonae Salmonella choleraesuis ssp diarizonae Salmonella choleraesuis ssp diarizonae Salmonella choleraesuis ssp indica Salmonella choleraesuis ssp indica Salmonella choleraesuis ssp salamae Salmonella dakar Salmonella dakar	SALABO SALABO SALADI SALADI SALADI SALADA SALANA SALANA SALANA SALANA SALBAN SALBAN SALBON SALBON SALBNA SALBNA SALCHO
Corynebacterium diphtheriae ssp mitis Corynebacterium diphtheriae ssp mitis Corynebacterium flavescens Corynebacterium genitalium biovar I Corynebacterium genitalium biovar II Corynebacterium genitalium biovar III Corynebacterium genitalium biovar VI Corynebacterium minutas Corynebacterium minutas Corynebacterium macginleyi Corynebacterium macginleyi Corynebacterium minutissimum Corynebacterium mycetoides Corynebacterium propinquum Corynebacterium pseudogenitalium biovar Corynebacterium renale group Corynebacterium renale group Corynebacterium renale group	CORDIPM CORDUR CORPLA CORGENI CORGENI CORGENII CORGENII CORGENIV CORGENV CORGENV CORGENV CORGENV CORGENV CORGENV CORMAC CORMAC CORMAC CORMAC CORMIN CORMUC CORMIN CORMUC CORPED CORPSG CORPSG CORPSGC1 CORPSGC1 CORPSGC1 CORPSGC2 CORPSGC3 CORPSGC4 CORPSGC4 CORPSGC4 CORPST CORRENG CORRENC C	Salmonella abortus-equi Salmonella adelaide Salmonella aderike Salmonella agona Salmonella alachua Salmonella anatum Salmonella anatum Salmonella avana Salmonella barenfeld Salmonella bongori Salmonella bongori Salmonella bongori Salmonella bredeney Salmonella bredeney Salmonella carrau Salmonella carrau Salmonella carrau Salmonella chittagong Salmonella choleraesuis sparizonae Salmonella choleraesuis Salmonella choleraesuis sparizonae Salmonella choleraesuis sparizonae Salmonella choleraesuis sparizonae Salmonella choleraesuis spaineela Salmonella choleraesuis spaineela Salmonella choleraesuis spaineela Salmonella choleraesuis spaineela Salmonella choleraesuis spaineela Salmonella choleraesuis spalamae Salmonella choleraesuis spalamae	SALABO SALABO SALADI SALADI SALADI SALADI SALADA SALADA SALARI SALANA SALBAH SALBAH SALBAN SALBAN SALBAN SALCHI SALCHI SALCHI SALCHO SALDAR
Corynebacterium diphtheriae ssp mitis Corynebacterium diphtheriae ssp mitis Corynebacterium flavescens Corynebacterium genitalium biovar I Corynebacterium genitalium biovar II Corynebacterium genitalium biovar II Corynebacterium genitalium biovar VI Corynebacterium jeikeium Corynebacterium macginleyi Corynebacterium macginleyi Corynebacterium macginleyi Corynebacterium mucifaciens Corynebacterium mucifaciens Corynebacterium pilosum Corynebacterium pseudogenitalium biovar Corynebacterium renale Corynebacterium renale Corynebacterium renale Corynebacterium seminale Corynebacterium seminale Corynebacterium seminale	CORDIPM CORDIPM CORPLA CORGENI CORGENI CORGENII CORGENII CORGENIV CORGENVI CORGENVI CORGENVI CORGLC CORJEI CORVIT CORMUC CORMUC CORMUC CORMUC CORMUC CORPSD CORPSG CORPSGC1 CORPSGC2 CCORPSC CCORPSC	Salmonella abortus-equi Salmonella aderike Salmonella aderike Salmonella aderike Salmonella adachua Salmonella anatum Salmonella anitum Salmonella arizonae Salmonella arizonae Salmonella bahrenfeld Salmonella bongori Salmonella bongori Salmonella bredeney Salmonella bredeney Salmonella bredeney Salmonella bredeney Salmonella carrau Salmonella carrau Salmonella carrau Salmonella choleraesuis Salmonella choleraesuis Salmonella choleraesuis ssp arizonae Salmonella choleraesuis ssp diarizonae Salmonella choleraesuis ssp indica Salmonella choleraesuis ssp indica Salmonella choleraesuis ssp salamae Salmonella choleraesuis ssp salamae Salmonella choleraesuis ssp salamae Salmonella choleraesuis ssp salamae Salmonella dakar Salmonella dakar Salmonella derby Salmonella derby Salmonella dessau Salmonella dublin	SALABOE SALABOE SALADL SALADR SALADA SALAAA SALAAA SALAAA SALAAA SALBAH SALBON SALBAN SALBAN SALBAN SALBAN SALCHO SALCHOI SALC
Corynebacterium diphtheriae ssp mitis Corynebacterium diphtheriae ssp mitis Corynebacterium genitalium Corynebacterium genitalium biovar I Corynebacterium genitalium biovar II Corynebacterium genitalium biovar III Corynebacterium genitalium biovar VI Corynebacterium minutas Corynebacterium minutas Corynebacterium macginleyi Corynebacterium macginleyi Corynebacterium minutissimum Corynebacterium mycetoides Corynebacterium propinquum Corynebacterium pseudogenitalium biovar Corynebacterium renale group Corynebacterium renale group Corynebacterium singulare Corynebacterium singulare	CORDIPM CORDUR CORPLA CORGENI CORGENI CORGENII CORGENII CORGENIV CORGENV CORGENV CORGENV CORGENV CORGENV CORGENV CORGENV CORMAC CORMAC CORMAC CORMAC CORMAC CORMIN CORMUC CORMIN CORMUC CORMIN CORMUC CORPSD CORPSG CCORPSG CCORPSGC1 CCORPSGC1 CCORPSGC2 CCORPSGC3 CCORPSGC4 CORPST CORRENG CORRENG CORRENG CORRENG CORRENG CORRENG CORRENG CORRENG CORRENG CORRENG CORRENG CORRENG CORRENG CORRENG CORRENG CORRENG CORRENG CORRENG CORSEM CORSEM CORSEM CORSEM	Salmonella abortus-equi Salmonella adelaide Salmonella aderike Salmonella adorike Salmonella adachua Salmonella anatum Salmonella anatum Salmonella anatum Salmonella avana Salmonella bahrenfeld Salmonella bongori Salmonella bongori Salmonella borgori Salmonella bredeney Salmonella bredeney Salmonella carrau Salmonella carrau Salmonella carrau Salmonella chittagong Salmonella choleraesuis sp arizonae Salmonella choleraesuis sp arizonae Salmonella choleraesuis sp diarizonae Salmonella choleraesuis ssp diarizonae Salmonella choleraesuis ssp houtenae Salmonella choleraesuis ssp salamae Salmonella dessalaam Salmonella deessalaam Salmonella duesseldorf	SALABO SALABO SALADI SALADI SALADI SALADI SALADA SALARI SALARI SALARI SALBAH SALBAH SALBAN SALBRA SALBRA SALCHI SALCHI SALCHO SALDN
Corynebacterium diphtheriae ssp mitis Corynebacterium diphtheriae ssp mitis Corynebacterium flavescens Corynebacterium genitalium biovar I Corynebacterium genitalium biovar II Corynebacterium genitalium biovar II Corynebacterium genitalium biovar VI Corynebacterium flavesch Corynebacterium flavesch Corynebacterium macginleyi Corynebacterium macginleyi Corynebacterium mucifaciens Corynebacterium mucifaciens Corynebacterium pilosum Corynebacterium pseudogenitalium Corynebacterium pseudogenitalium biovar Corynebacterium renale Corynebacterium renale Corynebacterium renale Corynebacterium seminale Corynebacterium seminale Corynebacterium seminale	CORDIPM CORDIPM CORPLA CORPLA CORGENI CORGENI CORGENII CORGENIU CORGENIV CORGENVI CORGENVI CORGLC CORJEI CORJEI CORMUT CORMUT CORMUT CORMUT CORMUT CORMUT CORMUT CORMUT CORMUT CORMUT CORMUT CORPSD CORPSD CORPSD CORPSGC1 CCORPSGC2 CCORPSGC3 CCORPSGC3 CCORPSGC3 CCORPSGC3 CCORPSGC3 CCORPSGC3 CCORPSGC3 CCORPSGC4 CORPST CORREN CORREN CORREN CORSIN CORSIN CORSIN CORSIN CORSIN CORSIN CORSTE	Salmonella abortus-equi Salmonella aderike Salmonella aderike Salmonella aderike Salmonella adachua Salmonella anatum Salmonella anatum Salmonella arizonae Salmonella arizonae Salmonella bahrenfeld Salmonella bockley Salmonella borgori Salmonella bredeney Salmonella bredeney Salmonella bredeney Salmonella bredeney Salmonella cariau Salmonella cariau Salmonella cariau Salmonella cariau Salmonella chempaign Salmonella choleraesuis ssp arizonae Salmonella choleraesuis ssp diarizonae Salmonella choleraesuis ssp indica Salmonella choleraesuis ssp indica Salmonella choleraesuis ssp salamae Salmonella dakar Salmonella dakar Salmonella derby Salmonella derby Salmonella derby Salmonella derby Salmonella derby	SALABOE SALADE SALADE SALADE SALADA SALANA SALANA SALANA SALANA SALBAH SALBON SALBON SALBRA SALBN SALCHOI SALC
Corynebacterium diphtheriae ssp mitis Corynebacterium diphtheriae ssp mitis Corynebacterium genitalium Corynebacterium genitalium biovar I Corynebacterium genitalium biovar II Corynebacterium genitalium biovar III Corynebacterium genitalium biovar VI Corynebacterium minutass Corynebacterium macginleyi Corynebacterium macginleyi Corynebacterium macginleyi Corynebacterium mycetoides Corynebacterium propinquum Corynebacterium propinquum Corynebacterium pseudogenitalium biovar Corynebacterium renale Corynebacterium renale group Corynebacterium renale group Corynebacterium seminale Corynebacterium singulare Corynebacterium singulare Corynebacterium singulare	CORDIPM CORDIPM CORPLA CORGENI CORGENI CORGENII CORGENII CORGENIV CORGENVI CORGENVU CORGENVI CORGENVI CORGENVI CORJEI CORJEI CORMAC CORMAC CORMAC CORMIN CORMUC CORMIN CORMUC CORPSD CORPSG CORPSG CCORPSG CCORPSGC1 CCORPSG CCORPSGC2 CCORPSGC2 CCORPSGC3 CCORPSGC4 CORPST CORRENGR CORRENGR CORRENGR CORRENGR CORRENGR CORSEM CORSEN CORS	Salmonella abortus-equi Salmonella adelaide Salmonella aderike Salmonella agona Salmonella alachua Salmonella anatum Salmonella anatum Salmonella avana Salmonella barenfeld Salmonella bongori Salmonella bongori Salmonella bordeney Salmonella bredeney Salmonella bredeney Salmonella carrau Salmonella carrau Salmonella carrau Salmonella chitagong Salmonella choleraesuis ssp arizonae Salmonella choleraesuis ssp diarizonae Salmonella choleraesuis ssp diarizonae Salmonella choleraesuis ssp salamonel Salmonella choleraesuis ssp salamonel Salmonella choleraesuis ssp salamonel Salmonella choleraesuis ssp salamae Salmonella delaesalaam Salmonella derby Salmonella duesseldorf Salmonella duesseldorf Salmonella duesseldorf	SALABO SALABO SALADI SALADI SALADI SALADI SALANA SALARI SALANA SALARI SALANA SALBAH SALBAH SALBAH SALBRA SALCAR SALCHA SALCHA SALCHO SA
Corynebacterium diphtheriae ssp mitis Corynebacterium diphtheriae ssp mitis Corynebacterium genitalium Corynebacterium genitalium biovar I Corynebacterium genitalium biovar II Corynebacterium genitalium biovar II Corynebacterium genitalium biovar VI Corynebacterium macginleyi Corynebacterium macginleyi Corynebacterium macginleyi Corynebacterium mucifaciens Corynebacterium mucifaciens Corynebacterium pilosum Corynebacterium pseudogenitalium Corynebacterium pseudogenitalium biovar Corynebacterium renale Corynebacterium renale Corynebacterium renale Corynebacterium seminale Corynebacterium seminale Corynebacterium seminale Corynebacterium seniale Corynebacterium seniale Corynebacterium seniale Corynebacterium seniale	CORDIPM CORDIPM CORPLA CORPLA CORGENI CORGENI CORGENII CORGENII CORGENIV CORGENVI CORGENVI CORGLC CORJEI CORJEI CORMAT CORMAT CORMAT CORMIN CORMUT CORMUT CORMUT CORMAT CORMAT CORMAT CORMAT CORMAT CORMAT CORMAT CORMAT CORMAT CORMAT CORMAT CORPS CORPSO CORPSO CORPSGC2 CCORPSGC3 CCORPSGC3 CCORPSGC3 CCORPSGC3 CCORPSGC4 CORPST CORREN CORRENG CORRENG CORRENG CORRENG CORRENG CORRENG CORSIN CORSIN CORSIN CORSTR CORSTR CORTHO CORNTO CORNTO CORNTO CORNTO CORNTO CORSTR	Salmonella abortus-equi Salmonella aderike Salmonella aderike Salmonella aderike Salmonella adachua Salmonella anatum Salmonella anitum Salmonella arizonae Salmonella avana Salmonella bahrenfeld Salmonella borgori Salmonella borgori Salmonella bredeney Salmonella bredeney Salmonella bredeney Salmonella bredeney Salmonella cariau Salmonella cariau Salmonella cariau Salmonella cariau Salmonella choleraesuis Salmonella choleraesuis ssp arizonae Salmonella choleraesuis ssp diarizonae Salmonella choleraesuis ssp indica Salmonella choleraesuis ssp indica Salmonella choleraesuis ssp salamae Salmonella dakar Salmonella dakar Salmonella derby Salmonella derby Salmonella derby Salmonella derby Salmonella derby Salmonella derby Salmonella derby Salmonella dublin Salmonella dublin	SALABOE SALADE SALADE SALADE SALADA SALAAA SALAAA SALAAA SALAAA SALBAH SALBON SALBAA SALBAR SALBON SALBAR SALCHOI SALC
Corynebacterium diphtheriae ssp mitis Corynebacterium diphtheriae ssp mitis Corynebacterium genitalium Corynebacterium genitalium biovar I Corynebacterium genitalium biovar II Corynebacterium genitalium biovar III Corynebacterium genitalium biovar VI Corynebacterium minutissi Corynebacterium minutissimum Corynebacterium macginleyi Corynebacterium minutissimum Corynebacterium mycetoides Corynebacterium propinquum Corynebacterium propinquum Corynebacterium pseudogenitalium biovar Corynebacterium renale Corynebacterium renale Corynebacterium renale Corynebacterium seminale Corynebacterium singulare Corynebacterium singulare Corynebacterium striatum Corynebacterium thomssenii Corynebacterium ucealyticum	CORDIPM CORDUR CORPLA CORGENI CORGENI CORGENII CORGENII CORGENIV CORGENVI CORGENV CORGENVI CORGENVI CORGENVI CORGENVI CORMUC CORMAC CORMAC CORMIN CORMUC CORMUC CORMUC CORPSD CORPSG CORPST CORREN CORREN CORREN CORREN CORSEM CORSEM CORSEN	Salmonella abortus-equi Salmonella aderike Salmonella aderike Salmonella aderike Salmonella adachua Salmonella anatum Salmonella anatum Salmonella avana Salmonella bahrenfeld Salmonella bongori Salmonella bongori Salmonella bredeney Salmonella bredeney Salmonella bredeney Salmonella bredeney Salmonella carrau Salmonella carrau Salmonella chitagong Salmonella choleraesuis Salmonella choleraesuis Salmonella choleraesuis ssp arizonae Salmonella choleraesuis ssp diarizonae Salmonella choleraesuis ssp diarizonae Salmonella choleraesuis ssp salamae Salmonella dessau Salmonella derby Salmonella duesseldorf Salmonella entritidis Salmonella fresno Salmonella gallinarum	SALABO SALABO SALADI SALADI SALADI SALADI SALADA SALAGO SALAIA SALARI SALARI SALARI SALBAR SALBAR SALBAR SALBAR SALCAR SALCHI SALCHI SALCHI SALCHO SA
Corynebacterium diphtheriae ssp mitis Corynebacterium diphtheriae ssp mitis Corynebacterium flavescens Corynebacterium genitalium biovar I Corynebacterium genitalium biovar II Corynebacterium genitalium biovar II Corynebacterium genitalium biovar VI Corynebacterium jelkeium Corynebacterium macginleyi Corynebacterium macginleyi Corynebacterium macginleyi Corynebacterium mucifaciens Corynebacterium mucifaciens Corynebacterium pilosum Corynebacterium pseudogenitalium Corynebacterium pseudogenitalium biovar Corynebacterium seudogenitalium biovar Corynebacterium seudogenitalium biovar Corynebacterium seudogenitalium biovar Corynebacterium seudogenitalium biovar Corynebacterium renale Corynebacterium renale group Corynebacterium seminale Corynebacterium seminale Corynebacterium seminale Corynebacterium senis Corynebacterium thomssenii Corynebacterium urealyticum Corynebacterium urealyticum	CORDIPM CORDIPM CORPLA CORPLA CORGENI CORGENI CORGENII CORGENII CORGENIV CORGENVI CORGENVI CORGENVI CORGENV CORGENV CORGENV CORMAC CORMAC CORMAC CORMIN CORMUC CORPIL CORPO CORPSD CORPSD CORPSGC1 CORPSGC2 CCORPSGC3 CCORPSGC3 CCORPSGC4 CORPST CORRENR CORRENR CORRENR CORRENR CORRENC CORPST CORRENC CORPST CORRENC CORRENC CORRENC CORSIN CORSIN CORSIN CORSTE CORSTE CORSTE CORSTE CORSTE CORSTE CORSTE CORSTE CORSTE CORSTE	Salmonella abortus-equi Salmonella aderike Salmonella aderike Salmonella aderike Salmonella adachua Salmonella anatum Salmonella anatum Salmonella arizonae Salmonella avana Salmonella bahrenfeld Salmonella borgori Salmonella borgori Salmonella bredeney Salmonella bredeney Salmonella bredeney Salmonella cariau Salmonella cariau Salmonella cariau Salmonella cariau Salmonella cheraeguis Salmonella choleraeguis ssp arizonae Salmonella choleraeguis ssp diarizonae Salmonella choleraeguis ssp indica Salmonella choleraeguis ssp indica Salmonella choleraeguis ssp indica Salmonella choleraeguis ssp salamae Salmonella dakar Salmonella dakar Salmonella derby Salmonella derby Salmonella dressalaam Salmonella dublin Salmonella dublin Salmonella dublin Salmonella dublin Salmonella dublin Salmonella gallinarum Salmonella gallinarum Salmonella gallinarum	SALABOE SALABOE SALADL SALADL SALADL SALADL SALADA SALARI SALARI SALARI SALARI SALBAH SALBAH SALBAD SALBAE SALBAN SALCAN SALCAN SALCHOI SALCHO
Corynebacterium diphtheriae ssp mitis Corynebacterium diphtheriae ssp mitis Corynebacterium genitalium Corynebacterium genitalium biovar I Corynebacterium genitalium biovar II Corynebacterium genitalium biovar II Corynebacterium genitalium biovar VI Corynebacterium macginleyi Corynebacterium macginleyi Corynebacterium macginleyi Corynebacterium mucifaciens Corynebacterium mucifaciens Corynebacterium pilosum Corynebacterium pilosum Corynebacterium pseudogenitalium biovar Corynebacterium seudogenitalium biovar Corynebacterium seudogenitalium biovar Corynebacterium renale Corynebacterium renale Corynebacterium seminale Corynebacterium singulare Corynebacterium singulare Corynebacterium stingulare Corynebacterium tomasenii Corynebacterium ulcerans Corynebacterium ulcerans Corynebacterium vitaeruminis	CORDIPM CORDIPM CORPLA CORGENI CORGENI CORGENII CORGENII CORGENIV CORGENVI CORGENVI CORGENVI CORGENVI CORGENVI CORGENVI CORGENVI CORMAC CORMAT CORMIN CORMIN CORMIN CORMIN CORMIN CORMIN CORPSD CORPSG CORPSG CCORPSGC1 CCORPSGC2 CCORPSGC2 CCORPSGC3 CCORPSGC3 CCORPSGC4 CORPST CORRENG CORRENG CORRENG CORRENG CORRENG CORRENG CORRENG CORSEN CO	Salmonella abortus-equi Salmonella aderike Salmonella aderike Salmonella aderike Salmonella adachua Salmonella anatum Salmonella anatum Salmonella avana Salmonella avana Salmonella bahrenfeld Salmonella bongori Salmonella bongori Salmonella bredeney Salmonella bredeney Salmonella bredeney Salmonella carrau Salmonella carrau Salmonella carrau Salmonella chitagong Salmonella choleraesuis ssp arizonae Salmonella choleraesuis ssp diarizonae Salmonella choleraesuis ssp diarizonae Salmonella choleraesuis ssp diarizonae Salmonella choleraesuis ssp salamae Salmonella choleraesuis ssp salamae Salmonella choleraesuis ssp salamae Salmonella choleraesuis ssp salamae Salmonella doleraesuis ssp salamae Salmonella doleraesuis ssp salamae Salmonella deressalaam Salmonella deressalaam Salmonella derssalaam Salmonella derssalaam Salmonella duesseldorf Salmonella gallinarum Salmonella gallinarum Salmonella galinarum Salmonella galinarum	SALABO SALABO SALADI SALADI SALADI SALADI SALADI SALADI SALAGO SALATA SALARI SALARI SALARI SALARI SALBRA SALBRA SALBRA SALCHI SALCHI SALCHI SALCHO

PSEALC PSEFLU PSEFLUPUT CHRMLUT PSEMEN PSEMON

RHOC RHOCCOP RHOCEQU RHOCERY RHOCEAS RHOCGLO RHOTSPE RHOT RHOTSPE RICK RIE RICK ROSFAU ROSSPE ROT ROSSPE ROT ROTPEN STOMUC RUMALB

RUMBRO STRHAN RUMPRO SAC SAC SACCR SACPAS SACCR SALADS SALADS SALADS SALADS SALADS SALADS SALADS SALADS SALADA SALANA SALCAN SALCRA SALCHI SALCCR SALCHI SALCHI SALCHI SALCHO SALCHOS SALCHO SALCHOS SALCHO

Coxiella	COX	Salmonella heidelberg	SALHEI
Coxiella burnetii	COXBUR	Salmonella illinois	SALILL
Cryptococcus albidus	CRY	Salmonella inverness	SALINF
Cryptococcus albidus var aerius	CRYALBAE	Salmonella java	SALINV
Cryptococcus albidus var albidus	CRYALBAL	Salmonella javiana	SALJAI
Cryptococcus albidus var diffluens	CRYALBD	Salmonella kirkee	SALKIR
Cryptococcus gastricus	CRYGAS	Salmonella kunduchi	SALKUN
Cryptococcus luteolus	CRILIT	Salmonella lansing	SALLAN
Cryptococcus neoformans	CRYNEO	Salmonella litchfield	SALLIT
Cryptococcus neoformans var gattii	CRYNEOG	Salmonella liverpool	SALLIV
Cryptococcus neoformans var neoformans	CRYNEON	Salmonella london	SALLON
Cryptococcus species	CRISPE	Salmonella luciana Salmonella manhattan	SALLUC
Cryptococcus uniguttulatus	CRYUNI	Salmonella meleagridis	SALMEL
Deinococcus	DEI	Salmonella memphis	SALMEM
Deinococcus radiodurans	DEIRAD	Salmonella michigan	SALMIC
Delftia Delftia agideverang	DELF	Salmonella minneapolis	SALMIA
Dermabacter	DERB	Salmonella montevideo	SALMON
Dermabacter hominis	DERBHOM	Salmonella muenchen	SALMUE
Dermacoccus	DERC	Salmonella newington	SALNEI
Dermacoccus nishinomiyaensis	MICNIS	Salmonella newport	SALNEP
Dermatophilus congolensis	DERI	Salmonella obio	SALNUI
Desulfomonas	DESM	Salmonella onderstepoort	SALOND
Desulfomonas pigra	DESMPIG	Salmonella oranienburg	SALORA
Desulfovibrio	DESV	Salmonella paratyphi A	SALPARA
Desultovibrio species	DESVSPE	Salmonella paratyphi B	SALPARB
Dialister pneumosintes	BACTPNE	Salmonella pullorum	SALPUL
Dichelobacter	DIC	Salmonella quinhon	SALQUI
Dichelobacter nodosus	DICNOD	Salmonella rubislaw	SALRUB
Dietzia	DIE	Salmonella saintpaul	SALSAI
DIECZIA MATIS DO NOT USE	STRING	Salmonella senftenberg	SALSCH
Dolosigranulum	DOL	Salmonella species	SALSPE
Dolosigranulum pigrum	DOLPIG	Salmonella tallahassee	SALTAL
Edwardsiella	EDW	Salmonella thompson	SALTHO
Edwardsiella hoshinae	EDWHOS	Salmonella typhi	SALTYP
Edwardsiella tarda	EDWICI	Salmonella virginia	SALVIR
Edwardsiella tarda biogroup 1	EDWTAR1	Salmonella westerstede	SALWES
Eggerthella	EGG	Salmonella worthington	SALWOR
Eggerthella lenta	EUBLEN	Sarcina	SAR
Enrichia chaffeensis	ЕНК	Sarcina species	SARSPE
Ehrlichia equi	EHREQU	Sebaldella	SEB
Ehrlichia sennetsu	EHRSEN	Sebaldella termitidis	SEBTER
Eikenella	EIK	Selenomonas	SEL
Eikenella corrodens	EIKCOR	Selenomonas artemidis	SELART
Empedobacter brevis	EMPBRE	Selenomonas flueggei	SELFLU
Enterobacter	ENTB	Selenomonas infelix	SELINF
Enterobacter aerogenes	ENTBAER	Selenomonas noxia	SELNOX
Enterobacter aerogenes/cloacae	ENTBAERCLO	Selenomonas sputigena	SELSPU
Enterobacter amnigenus biogroup 1	ENTBAMN1	Serratia entomonhila	SERENT
Enterobacter amnigenus biogroup 2	ENTBAMN2	Serratia ficaria	SERFIC
Enterobacter asburiae	ENTBASB	Serratia fonticola	SERFON
Enterobacter cancerogenus	ENTBCAN	Serratia grimesii	SERGRI
Enteropacter cloacae Enteropacter dissolvens	ENTBOLO	Serratia liqueiaciens Serratia marcescens	SERLIQ
Enterobacter gergoviae	ENTBGER	Serratia odorifera	SERODO
Enterobacter hormaechei	ENTBHOR	Serratia odorifera 1	SEROD01
Enterobacter intermedius	ENTBINT	Serratia odorifera 2	SERODO2
Enterobacter Kobel	ENTBROB	Serratia piymutnica	SERPLY
Enterobacter sakazakii	BNIBNIN		CEDDDOD
Patauchastan anasias	ENTBSAK	Serratia proteamaculans ssp guinovora	SERPROP SERPROO
Enteropacter species	ENTBSAK	Serratia proteamaculans ssp quinovora Serratia rubidaea	SERPROP SERPROQ SERRUB
Enterococcus	ENTBSAK ENTBSPE ENTC	Serratia proteamaculans ssp quinovora Serratia rubidaea Serratia species	SERPROP SERPROQ SERRUB SERSPE
Enterococcus Enterococcus avium	ENTBSAK ENTBSPE ENTC ENTCAVI ENTCAVI	Serratia proteamaculans ssp quinovora Serratia rubidaea Serratia species Shewanella Ghewanella	SERPROP SERPROQ SERRUB SERSPE SHE
Enterococcus Enterococcus avium Enterococcus avium HRE Enterococcus casseliflavus	ENTBSAK ENTBSPE ENTC ENTCAVI ENTCAVIHR ENTCAVIHR	Serratia proteamaculans ssp quinovora Serratia rubidaea Serratia species Shewanella Shewanella algae Shewanella putrefaciens	SERPROP SERPROQ SERRUB SERSPE SHE SHEALG SHEPUT
Enterococcus Enterococcus avium Enterococcus avium HRE Enterococcus casseliflavus Enterococcus casseliflavus HRE	ENTESAK ENTESPE ENTC ENTCAVI ENTCAVIHR ENTCCAS ENTCCASHR	Serratia proteamaculans ssp quinovora Serratia rubidaea Serratia species Shewanella Shewanella algae Shewanella putrefaciens Shewanella putrefaciens biovar 1	SERPROP SERPROQ SERRUB SERSPE SHE SHEALG SHEPUT SHEPUT1
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-144 TC	Staphylococcus capitis ssp capitis	STACALC
	Staphylococcus capitis ssp ureoryticus	STACALU
JLAD	Staphylococcus caprae	STACAP
DLATY	Staphylococcus carnosus	STACAR
DLHS	Staphylococcus carnosus ssp carnosus	STACARC
DLINA	Staphylococcus carnosus ssp utilis	STACARU
DL0111	Staphylococcus chromogenes	STACHR
DL0157	Staphylococcus chromogenes/hyicus	STACHRHYI
3R.	Staphylococcus coag negative	STACNEG
ER	Staphylococcus cohnii	STACOH
JL	Staphylococcus cohnii ssp cohnii	STACOHC
	Staphylococcus cohnii ssp urealyticum	STACOHU
AR	Staphylococcus delphini	STADEL
FF	Staphylococcus epidermidis	STAEPT
22	Staphylococcus epidermidis MP	STAFDIMP
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ΑB	Staphylococcus pasteuri	STAPAS
AP	Staphylococcus piscifermentans	STAPIS
ER	Staphylococcus pulvereri	STAPUL
⊃E	Staphylococcus saccharolyticus	STASAC
Π.	Stanhylococcus sanronhyticus	STASAD
ZNI	Staphylococcus Suprophyticus	CTACADMD
510	Staphylococcus saprophyticus MR	GENGAPPIK
JR	Staphylococcus saprophyticus ssp bovis	STASAPB
SN	Staphylococcus saprophyticus ssp saprophyticus	STASAPS
JRM	Staphylococcus schleiferi	STASCH
JRS	Staphylococcus schleiferi ssp coagulans	STASCHC
JRY	Staphylococcus schleiferi ssp schleiferi	STASCHS
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Succipivibrio	
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Sutterella	
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Tiggierella	
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STRMUTGR

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Kurthia zopfii	KURZOP	Yersinia rohdei	YERROH
Kytococcus	KYT	Yersinia ruckeri	YERRUC
Kytococcus sedentarius	MICSED	Yersinia species	YERSPE
Lactobacillus	LACB	Yokenella	YOK
Lactobacillus acidophilus	LACBACI	Yokenella regensburgei	YOKREG
Lactobacillus brevis	LACBBRE	Zygosaccharomyces	ZYG
Lactobacillus buchneri	LACBBUC	Zygosaccharomyces bailli	ZYGBAI
Lactobacillus casei	LACBCAS	Zygosaccharomyces species	ZYGSPE

## 14. Appendix E – BD Instrument Specifics

## 14.1. BACTEC MGIT 960

BACTEC MGIT 960 supports ASTM E\_1394 Logical Protocol and ASTM E\_1381 Physical Protocol.

## 14.1.1. Configurable Options

- *LIS Enable* –acceptable values are ENABLE or DISABLE. Used to enable the LIS interface within the instruments. The instrument defaults to DISABLE.
- *Baud Rate* acceptable values are 1200, 2400, 4800, 9600, 19200. The instrument defaults to 9600.

Data Bits - acceptable values are 7 and 8. The instrument defaults to 8.

- Stop Bits acceptable values are 1 and 2. The instrument defaults to 1.
- *Parity* acceptable values are ODD, EVEN, and NONE. The instrument defaults to NONE.
- *Upload Results* acceptable values are SOLICITED and UNSOLICITED. The instrument defaults to UNSOLICITED. In unsolicited mode the instrument automatically uploads results as tests are completed. The instrument in solicited mode waits for LIS to request the results.
- *Consumable Tracking* acceptable values include ENABLE or DISABLE. The instrument defaults to DISABLE. Enabling this option causes the instrument to automatically send a specimen's test status to the LIS when a specimen has been scanned-in the instrument for the first time (ONGOING) or scanned-out of the instrument (REMOVED) (automatic transfer when UPLOAD\_RESULT option set to UNSOLICITED).
- *Orphan Result* acceptable values include ENABLE and DISABLE. The instrument defaults to DISABLE. Enabling this option causes the instrument to report results for tests that do NOT have an accession number associated with them.
- *Packed Frames* acceptable values include ENABLE and DISABLE. The instrument defaults to ENABLE. Enabling this option allows message frames sent to the LIS to support multiple records per frame ("packed"). When Disabled, only one record is tranmitted per frame.

## 14.1.2. Message Content

#### **Field List**

The BACTEC MGIT 960 shall exchange fields with the LIS per the following table:

Header Record Field Name	ASTM Pos.	Direction
Sender Name	H, 5, 1, 1	U
Version Number	H, 13, 1, 1	U
Message Date/Time	H 14, 1, 1	U

Order Record Field Name	ASTM Pos.	Direction
Accession Number	0, 3, 1, 1	U
Isolate Number	0, 3, 1, 2	U

Order Record Field Name	ASTM Pos.	Direction
Test ID	0, 5, 1, 4	U
Result Record Field Name	ASTM Pos.	Direction
Result Type Code	R, 3, 1, 4	U
Test/Consumable Sequence	R, 3, 1, 5	U
Number		
Antibiotic	R, 3, 1, 6	U
Antibiotic Concentration	R, 3, 1, 7	U
Antibiotic Concentration Units	R, 3, 1, 8	U
Test Status	R, 4, 1, 1	U
Result Data 1		
BACTEC MGIT 960	R, 4, 1, 2	U
Growth Units		
Result Data 3		
AST susceptibility (Interpreted)	R, 4, 1, 4	U
Preliminary/Final Status	R, 9, 1, 1	U
Test Start Date/Time	R, 12, 1, 1	U
Result/Status Date/Time	R, 13, 1, 1	U
Instrument Type	R, 14, 1, 1	U
Protocol Length	R, 14, 1, 3	U
Instrument Number	R, 14, 1, 4	U
Instrument Location	R, 14, 1, 5	U

Request Record Field Name	ASTM Pos.	Direction
Request Starting Patient Id	Q, 3, 1, 1	
Request Starting Accession	Q, 3, 1, 2	D
Number		
Request Starting Sequence	Q, 3, 1, 3	D
Number		
Request Ending Patient Id	Q, 4, 1, 1	
Request Ending Accession	Q, 4, 1, 2	
Number		
Request Ending Sequence	Q, 4, 1, 3	
Number		
Request Test Id	Q, 5, 1, 1	D
Request Test Status	Q, 5, 1, 2	D
Request Instrument Type	Q, 5, 1, 3	
Request Instrument Number	Q, 5, 1, 4	
Request Result Qualifier	Q, 5, 1, 5	D
Request Time Qualifier	Q, 6, 1, 1	
Starting Date/Time	Q, 7, 1, 1	D
Ending Date/Time	Q, 8, 1, 1	D
Request Information Status	Q, 13, 1, 1	
Code		
Terminator Record Field Name	ASTM Pos	Direction

Terminator Record Field Name	ASTM Pos.	Direction
Termination Code	L, 3, 1, 1	U/D

#### **Field Descriptions**

#### Header Fields

General

#### **Patient Fields**

BACTEC MGIT 960 does not support patient information and therefore always transmits an empty Patient record.

#### **Order Fields**

Accession Number (0, 3, 1, 1) – The unique alphanumeric string that identifies a specimen. This field can be up to 20 characters long. (e.g. Acc123).

Isolate Number (0, 3, 1, 2) – Specimen's assigned isolate number.

Test Id (O, 5, 1, 4) –MGIT 960 transmits MGIT\_960\_GND for Growth and Detection specimens or MGIT\_960\_AST for AST sets.

#### **Result Fields**

**Result Id Code (R, 3, 1, 4)** – transmits **GND\_MGIT** for growth and Detection specimens or **AST\_MGIT** for AST sets.

**Test Sequence Number (R, 3, 1, 5)** – specimen's assigned sequence number (barcode) that is always be 12 digits.

**Drug Abbreviation** (**R**, **3**, **1**, **6**) – Antibiotic abbreviation used for a drug within an AST set.

**Drug Concentration** (**R**, **3**, **1**, **7**) – Drug concentration used for a drug within an AST set.

**Drug Units of Measurement (R, 3, 1, 8)** – Drug units of measurement used for a drug within an AST set.

**Test Status LIS Code (R, 4, 1, 1)** – BACTEC MGIT 960 transmits the following specimen status:

INST\_ONGOING INST\_POSITIVE INST\_NEGATIVE INST\_COMPLETE INST\_REMOVED (for Ongoing Removed only) INST\_ERROR

It should be noted that Result records are not transmitted for G&D specimens that are in error. However, Result records are transmitted for AST set specimens that are in error because an AST set in error is considered a completed status. An AST set in error cannot return to an Ongoing state. A G&D specimen in error requires the users to resolve the before it returns to an Ongoing or Completed state.

**Result Data**  $(\mathbf{R}, 4, 1, 2)$  – The BACTEC MGIT 960 instrument measures Mycobacterial growth. The instrument assigns a numerical value to quantify the amount of growth in a tube. This growth value is placed in the second component for any results generated by

this instrument, one of either **GND\_MGIT** or **AST\_MGIT** tests. This field is never more than 5 characters long.

**AST SIR Status (R, 4, 1, 4)** – The BACTEC MGIT 960 instrument transmits an **'S'** for susceptible, **'I'** for Indeterminate (not currently used), or an **'R'** for resistant.

Result Status Code (R, 9, 1, 1) – Always a 'P' for Premliminary result.

**Start Date/Time (R, 12, 1, 1)** – This is the date and time that the test was first started or entered into an instrument. This field is formatted as described in the ASTM E\_1394 specification in section 6.6.2.

The BACTEC MGIT 960 AST tests are run in reusable plastic carriers. The plastic carrier contains a sequence number that uniquely identifies the tube carrier. This is the sequence number transmitted with results up to the LIS. However, it is possible that a single plastic carrier could be used more than once for a particular access number. If the LIS intends to allow these carriers to be used more than once for the same access number, then the LIS should take note of the test start date/time. The test start date/time, with the sequence number, uniquely identifies a test and its result.

MGIT AST test information downloaded from the LIS is checked for this start date/time. If this field is filled, meaning that existing results are being copied back to the EpiCenter, the EpiCenter tries to use it to match an existing test in its database. New test orders should not fill this field. If the test sequence number and entry date/time don't match an existing test, or are blank, then the EpiCenter considers it a new test order.

**Test Result Date/Time** (**R**, **13**, **1**, **1**) – The instrument's date and time that the specimen completed its test.

- For an INST\_ONGOING specimen this field is empty.
- For an INST\_POSITIVE specimen this is the time the specimen went positive.
- For an INST\_NEGATIVE specimen this is the time the specimen went negative (calculated by adding the protocol length with the start time).
- For an INST\_REMOVED specimen, this is the time the specimen was removed from the instrument.
- For an INST\_COMPLETE specimen this is the time the AST set completed.
- For an INST\_ERROR specimen this is the time the AST set went into error (this is considered a completed status).

Instrument Type (R, 14, 1, 1) – transmits a 'MGIT960'.

Protocol Length (R, 14, 1, 3) – the specimen's assigned protocol length.

**Instrument Number** (**R**, **14**, **1**, **4**) –the user configured instrument number that ranges from 1 to 99.

**Instrument Location (R, 14, 1, 5)** – the specimen's location within the instrument. For example, Drawer A, Row D, Column 12 would be represented as "A/D12".

#### **Request Fields**

The ASTM 1394 protocol defines this as a Request Information Record message. A download Request record is also known as a "Query". The only type of download "Query" request that the Firefly instrument accepts is a request for test results. A Terminator record with a termination code of "F" or "Q" is used to signal the last packet of a query response. If a query request was invalid, the instrument interface responds

with only the Terminator record with a termination code of "Q". If the instrument interface can not locate any specimens in the active or history databases that meet the query criteria, it responds with only the Terminator record with a termination code of "F". Note, that the BACTEC MGIT 960 instrument does NOT request data from an LIS.

A query contains a set of request parameters that are used to determine which specimen(s) to access. The following tables define the ASTM 1394 Request record fields that are transmitted from the LIS in an Download message and the MGIT 960 statuses that correspond to the StatusId field.

Accession Number (Q, 3, 1, 2) – The unique alphanumeric string that identifies a specimen. This field can be up to 20 characters long. (e.g. Acc123). The use of "ALL" or no definition indicates that the Accession # is not used as a search parameter in the query.

Sequence Number (Q, 3, 1, 3) – specimen's assigned sequence number (barcode) that is always be 12 digits. The use of "ALL" or no definition indicates that the Sequence # is not used as a search parameter in the query.

Test ID (Q, 5, 1, 1) – The BACTEC 960 instrument accepts the test ids MGIT\_960\_GND, MGIT\_960\_AST, or ALL and return the test results for those test types currently in the instrument. The keyword ALL returns both GND and AST test results that are currently in the instrument.

**Test Status Id** (Q, 5, 1, 2) – The status of the specimens being requested. This field is only evaluated if the Test ID field contains valid data. No definition indicates that the specimen status is not used as a search parameter.

The following Test Statuses are used when requesting test results for specimens:

INST\_ONGOING (G&D and AST) INST\_POSITIVE INST\_NEGATIVE INST\_COMPLETE (G&D and AST)

**Qualifier** (Q, 5, 1, 5) – optional qualifier '**MOD**' that indicates that the request is for specimen results that have been modified/changed since last request.

**Beginning Time** (**Q**, **7**, **1**, **1**) – the beginning time and date used when requesting data that occurred within a specified time range.

End Time (Q, 8, 1, 1) – the ending time and date used when requesting data that occurred within a specified time range.

When a "Time Range" has been specified in a Query (Begin Time and/or End Time fields), the time field from the instrument's database that is used for comparison is dependent upon the Query's "TestId" field as follows,

INST_ONGOING	- Time the specimen was scanned into instrument.
INST_POSITIVE	- Time the specimen went positive.
INST_NEGATIVE	- Time the specimen went negative.
INST_REMOVED	- Time the specimen was removed.
INST_COMPLETE	- Time the AST set specimen completed.
INST ERROR	- Time the AST set specimen went into error.

#### **Terminator Fields**

General

## 14.1.3. Example ASTM 1394 Protocol

The following are examples of various instrument message transmissions that conform to the Becton Dickinson Common LIS Interface using the ASTM 1394 protocol.

```
MGIT960 G&D specimen that has been entered into an instrument, but has NOT been tested:
```

```
H|\^&|||Becton Dickinson|7 Loveton Circle^Sparks^MD^21152||410 316-
4000|||P|V1.00|19981019184200
P|1
O 1|0970038018||^^^MGIT_ 960 GND
R 1|^^GND_MGIT^430109967349|INST_ONGOING^0||||P|||MGIT960^42^1^B/A01
L 1 N
```

MGIT960 G&D specimen that has been tested and is still active in the instrument:

```
H|\^&|||Becton Dickinson|7 Loveton Circle^Sparks^MD^21152||
410 316-4000||||P|V1.00|19981019184200
P|1
O 1|0970038018||^^^MGIT_960_GND
R 1|^^^GND_MGIT^430109967349|INST_ONGOING^123||||P||19960502115414|
19960507115414|MGIT960^42^1^B/A01
L|1|N
```

#### MGIT960 G&D specimen that has been tested POSITIVE:

```
H|\^&|||Becton Dickinson|7 Loveton Circle^Sparks^MD^21152||
410 316-4000||||P|V1.00|19981019184200
P|1
O 1|0970038018||^^^MGIT_960_GND
R 1|^^^GND_MGIT_430109967349|INST_POSITIVE^1234||||P||19960502115414|
19960509123456|MGIT960^42^1^B/A01
L|1|N
```

#### MGIT960 G&D specimen that has been tested NEGATIVE:

```
H|\^&|||Becton Dickinson|7 Loveton Circle^Sparks^MD^21152||
410 316-4000||||P|V1.00|19981019184200
P|1
0 1|0970038018||^^^MGIT_960_GND
R 1|^^^GND_MGIT^430109967349|INST_NEGATIVE^12||||P||19960502115414|
19960509123456|MGIT960^42^1^1B/A01
L|1|N
```

MGIT960 AST specimens that have been entered into an instrument, but has NOT been tested:

```
H|\^&|||Becton Dickinson|7 Loveton Circle^Sparks^MD^21152||
410 316-4000||||P|V1.00|19981019184200
P|1
O 1|0970038018^1||^^^MGIT_960_AST
R|1|^^AAST_MGIT^439309967349^EMB^5.0^ug/ml|INST_ONGOING^0||||P|||||
MGIT960^^13^B/A02
R|2|^^AST_MGIT^439309967349^RIF^1.0^ug/ml|INST_ONGOING^0||||P|||||
MGIT960^^13^B/A03
L|1|N
```

MGIT960 AST specimens from an AST set that have been tested and are still active in the instrument:

```
H|\^&|||Becton Dickinson|7 Loveton Circle^Sparks^MD^21152||
410 316-4000||||P|V1.00|19981019184200
```

P|1
O 1|0970038018^1||^^^MGIT\_960\_AST
R|1|^^AAST\_MGIT^439309967349^EMB^5.0^ug/ml|INST\_ONGOING^123||||P|||
19960502115414|19960502115414|MGIT960^\*^13^B/A02
R|2|^^AAST\_MGIT^439309967349^RIF^1.0^ug/ml|INST\_ONGOING^12||||P|||
19960502115414|19960502115414|MGIT960^\*^13^B/A03
L|1|N

MGIT960 AST specimens that have completed testing:

H|\^&||Becton Dickinson|7 Loveton Circle^Sparks^MD^21152||
410 316-4000|||P|V1.00|19981019184200
P|1
O 1 0970038018^1||^^^MGIT\_960\_AST
R 1 |^^AST\_MGIT^439309967349^EMB^5.0^ug/ml|INST\_COMPLETE^1234^R||||P|||
19960502115414|19960502115414|MGIT960^^13^B/A02
R 2 |^^AST\_MGIT^439309967349^RIF^1.0^ug/ml|INST\_COMPLETE^12^S||||P|||
19960502115414|19960502115414|MGIT960^^13^B/A03
L 1 |N

<u>A Request Record (Query) sent from an LIS to a MGIT960 instrument **requesting all specimen results for a** <u>period of time.</u></u>

H \^&|||||||||||19990208000001 Q 1 ^ALL ALL |ALL|19980502123000|19980613123000 L 1 N

A Request Record (Query) sent from an LIS to a MGIT960 instrument requesting only ONGOING specimen results for a period of time.

H \^&|||||||||||19990208000001
Q 1 | ALL ALL | INST\_ONGING | 19980502123000 | 19980613123000
L 1 N

<u>A Request Record (Query) sent from an LIS to a MGIT960 instrument requesting all specimen results which have been assigned the specified Accession #.</u>

H \^&|||||||||||19990208000001 Q 1 ^Access1234 | ALL L 1 N

<u>A Request Record (Query) sent from an LIS to a MGIT960 instrument **requesting a specimen result which has** been assigned the specified Sequence #.</u>

```
\begin{array}{l} \textbf{H} \left| \left| \left| \left| \right| \right| \right| \right| \right| \left| \left| \right| \right| \right| 19990208000001 \\ \textbf{Q} \left| 1 \right|^{430109967349} \right| \text{ALL} \\ \textbf{L} \left| 1 \right| \textbf{N} \end{array}
```

<u>A Request Record (Query) sent from an LIS to a MGIT960 instrument **requesting all specimen results which have** <u>been modified/changed since the last request.</u></u>

<u>A Request Record (Query) sent from an LIS to a MGIT960 instrument requesting all G&D specimen results that</u> went Positive between January 2, 1999 at 15:34:00 and January 3, 1999 at 15:34:00.

```
\begin{array}{l} \textbf{H} \\ \textbf{A} \\ \textbf{Q} \\ \textbf{I} \\ \textbf{I} \\ \textbf{M} \\ \textbf{GIT\_GND^INST\_POSITIVE} \\ \textbf{I} \\ \textbf{I} \\ \textbf{I} \\ \textbf{N} \\ \textbf{I} \\ \textbf{N} \end{array}
```

## 14.2. BDProbeTec ET & Viper SP

BDProbeTec ET supports ASTM E\_1394 Logical Protocol and ASTM E\_1381 Physical Protocol.

BDProbeTec ET does not send results for specimens without accession or specimen numbers. As such the instrument does not allow LIS communication to be enabled unless the instrument Specimen Tracking/Accession Barcoding feature is enabled. The feature is enabled from a configuration screen.

#### 14.2.1. Configurable Options

- Comm Port Number is a dedicated communication port on the instrument and therefore is not configurable.
- Baud Rate acceptable values are 2400, 4800, 9600, 14400, 19200, 38400. The instrument defaults to 9600.
- Data Bits acceptable values are 7 and 8. The instrument defaults to 8.
- Stop Bits acceptable values are 1 and 2. The instrument defaults to 1.
- Parity acceptable values are ODD, EVEN, and NONE. The instrument defaults to NONE.
- Upload Mode acceptable values are SOLICITED and UNSOLICITED. The instrument defaults to UNSOLICITED. The instrument in unsolicited mode uploads results as tests are completed. The instrument in solicited mode waits for the LIS to request the results.
- Low Positive Status Upload select 1 to enable the option or 0 to disable the option on BDProbeTec ET. Check to enable the option on Viper SP. If the option is enabled, a MOTA value greater than or equal to 2,000 and less than 10,000 will produce an **INST\_LOW\_POS Test Status LIS Code (R,4,1,1)**. Disabled is the default.

#### 14.2.2. Message Content

#### **Field List**

Header Record Field Name	ASTM	Direction
	Pos.	
Sender Name	H, 5, 1, 1	U
Version Number	H, 13, 1, 1	U
Message Date/Time	H 14, 1, 1	U

Order Record Field Name	ASTM	Direction
	Pos.	
Accession Number	0, 3, 1, 1	U
Test ID	0, 5, 1, 4	U
Specimen Action Code	0, 12, 1, 1	U

Result Record Field Name	ASTM	Direction
	Pos.	
Result Type Code	R, 3, 1, 4	U
Test/Consumable Sequence Number	R, 3, 1, 5	U
Test Status	R, 4, 1, 1	U

Result Record Field Name	ASTM	Direction
	Pos.	
Result Data 1		
ProbeTecET/Viper SP	R, 4, 1, 2	U
Alg.Results		
Test Start Date/Time	R, 12, 1, 1	U
Result/Status Date/Time	R, 13, 1, 1	U
Instrument Type	R, 14, 1, 1	U
Media/Assay Type	R, 14, 1, 2	U
Instrument Number	R, 14, 1, 4	U
Instrument Location	R, 14, 1, 5	U
QC Type	R, 14, 1, 6	U
QC Kit Lot Number	R, 14, 1, 7	U

Request Record Field Name	ASTM	Direction
	Pos.	
Request Starting Patient Id	Q, 3, 1, 1	
Request Starting Accession Number	Q, 3, 1, 2	
Request Starting Sequence Number	Q, 3, 1, 3	
Request Ending Patient Id	Q, 4, 1, 1	
Request Ending Accession Number	Q, 4, 1, 2	
Request Ending Sequence Number	Q, 4, 1, 3	
Request Test Id	Q, 5, 1, 1	D
Request Test Status	Q, 5, 1, 2	
Request Instrument Type	Q, 5, 1, 3	
Request Instrument Number	Q, 5, 1, 4	
Request Result Qualifier	Q, 5, 1, 5	D
Request Time Qualifier	Q, 6, 1, 1	
Starting Date/Time	Q, 7, 1, 1	
Ending Date/Time	Q, 8, 1, 1	
Request Information Status Code	Q, 13, 1, 1	

Terminator Record Field Name	ASTM Pos.	Direction
Termination Code	L, 3, 1, 1	U/D

#### **Field Descriptions**

#### **Header Fields**

General

#### **Patient Fields**

BDProbeTec ET does not support patient information and therefore always transmits an empty Patient record.

**P**|1

## **Order Fields**

Accession Number (0, 3, 1, 1) – The unique alphanumeric string that identifies a specimen. This field can be up to 20 characters long. (e.g. Acc123) This is a required field for processing specimen and test information. The instrument excludes the

following special characters from being entered in the accession / specimen number field and therefore never transmits them: \* ? [] #

**Test Id** (**O**, **5**, **1**, **4**) –BDProbeTec ET transmits **BD\_PROBETEC\_GND** for the test id code field.

Specimen Action Code (0, 12, 1, 1) - In the special case when no accession / specimen number is transmitted then the Specimen Action Code is designated 'Q' as an indicator to treat the result as a QC result.

P|1 O|1|Accession\_789 | | ^ ^ BD\_PROBETEC\_GND P|1 O|1| | | ^ ^ BD\_PROBETEC\_GND| | | | | | | | Q

#### **Result Fields**

**Result Id Code** (**R**, **3**, **1**, **4**) – BDProbeTec ET always transmits 'GND\_PROBETEC' for the result id code.

**Test Sequence Number** (**R**, **3**, **1**, **5**) – Designates the assay kit lot number and is always 9 digits.

**Test Status LIS Code (R, 4, 1, 1)** – BDProbeTec ET transmits the following specimen status:

INST\_POSITIVE INST\_LOW\_POS (If enabled, see Configurable Options) INST\_NEGATIVE INST\_INDETERMINATE INST\_EQUIVOCAL

The instrument transmits the following QC status: INST\_QC\_PASS INST\_QC\_FAIL

Algorithmic Results (R, 4, 1, 2) – (future)

**Test Start Date/Time**  $(\mathbf{R}, \mathbf{12}, \mathbf{1}, \mathbf{1})$  – BDProbeTec ET transmits the instrument's date and time that the specimen started its test. Time zone is not included.

**Test Result Date/Time**  $(\mathbf{R}, \mathbf{13}, \mathbf{1}, \mathbf{1})$  – BDProbeTec ET transmits the instrument's date and time that the specimen ended its test. Time zone is not included. Typically, the test result date and time are 1 hour after the test start date and time.

**Instrument Type** (**R**, **14**, **1**, **1**) – BDProbeTec ET transmits a '**PROBETEC'** for its instrument type.

Media (Assay) Type (R, 14, 1, 2) – BDProbeTec ET transmits the following assay types:

SP) SP)

l – CT assay	(Viper
2 – GC assay	(Viper
<b>3</b> – Intentionally skipped	

- 4 DTB assay
- 5 ctb assay
- $6 \max$  assay
- 7 kan assay
- 8 Intentionally skipped
- 9 CF assay
- 10 LP assay
- 11 MP assay

<b>12</b> – tCF assay	
13 – tMP assay	
14 – dCT assay	(Viper SP)
15 – dGC assay	(Viper SP)
16 – SCV assav	

The list of assay types will expand as further assays are supported on the BDProbeTec ET instrument.

**Protocol Length** (**R**, **14**, **1**, **3**) – BDProbeTec ET currently has a 1 hour test time and therefore does not transmit a protocol length.

**Instrument Number (R, 14, 1, 4)** – BDProbeTec ET transmits the user configured instrument number that ranges from 1 to 99.

**Instrument Location (R, 14, 1, 5)** – BDProbeTec ET transmits a plate number from 1 to 30, followed by a 96 microwell location of row (A-H), then column (1-12)

Viper SP transmits a plate number from 1 to 60, followed by a 96 microwell location of row (A-H), then column (1-12).

QC Type (**R**, 14, 1, 6) – BDProbeTec ET transmits a '+' or '-' if the parent Order record designates a QC result to indicate what type of QC, positive or negative QC.

QC Kit Lot Number (R, 14, 1, 7) – BDProbeTec ET transmits a value only if parent order record is designated as a QC test.

**P**|1

O|1|Accession\_789 || ^ ^ BD\_PROBETEC\_GND **R**|1| ^ ^ GND\_PROBETEC ^000120299|INST\_NEGATIVE| || || || |19981019153400|19981019163400| PROBETEC ^1^^314A10

**P**|1

O|1|||^^^BD\_PROBETEC\_GND|||||||Q **R**|1|^^^GND\_PROBETEC ^000120299|INST\_QC\_PASS||||||| |19981019153400|19981019163400| PROBETEC ^1^^314H12^+^000031500

#### **Request Fields**

The ASTM 1394 protocol defines this as a Request Information Record message. A download Request record is also known as a "Query". The only type of download "Query" request that the BD ProbeTec ET instrument accepts is a request for test results. The BD Probetec ET instrument will accept "query" requests in either the SOLICITED or UNSOLICITED settings for the Upload Mode as described above under Configurable Options. Note, that the BD PROBETEC ET instrument does NOT request data from an LIS.

**Test ID** (**Q**, **5**, **1**, **1**) – BDProbeTec ET accepts the following test name: **BD\_PROBETEC\_GND**. The keyword **ALL** can also be used to return all of the test results currently in the instrument.

Q|1| | |BD\_PROBETEC\_GND

Q|1| | |ALL

**Result Qualifier** (**Q**, **5**, **1**, **5**) – BDProbeTec ET accepts the following result qualifiers:

MOD - All available results that have not been previously transmitted to the LIS.

Q|1| | |BD\_PROBETEC\_GND^^^MOD

## **Terminator Field**

General

## 14.2.3. Example ASTM 1394 Protocol

The following are examples of valid requests for test results from the LIS to the BD PROBETEC ET instrument that conform to the Becton Dickinson Common LIS Interface using the ASTM 1394 protocol:

A Request Record (Query) sent from an LIS to a BD PROBETEC ET instrument **r** equesting all test results currently in the instrument.

H|\^& Q|1|||ALL L|1|N

A Request Record (Query) sent from an LIS to a BD PROBETEC ET instrument requesting all available test results that have not been previously transmitted to the LIS.

```
H|\^&
```

Q|1||| BD\_PROBETEC\_GND^^^MOD

L|1|N

## 14.3. BD Phoenix 100

BD Phoenix 100 supports ASTM E\_1394 Logical Protocol and ASTM E\_1381 Physical Protocol.

## 14.3.1. Configurable Options

The BD Phoenix 100 provides 3 groups of Configurable Options for customizing the LIS Interface.

**General Options** 

**Results Upload Options** 

**Communications Setup** 

The instrument also provides an Organism Configuration Screen and an Antimicrobial Configuration Screen for editing LIS Codes.

#### 14.3.1.1.General Options

#### **Send Interpretation Results**

Acceptable values are CHECKED and UNCHECKED. When CHECKED, final SIR values are included in the AST result record. The instrument defaults to CHECKED.

#### **Unsolicited Queries**

Acceptable values are CHECKED and UNCHECKED. When CHECKED, the instrument shall issue a query to the LIS at the time the panel is physically placed in the instrument if the panel is missing an organism id. The instrument defaults to UNCHECKED.

#### Send When Placed In Instrument

Acceptable values are CHECKED and UNCHECKED. When CHECKED, the instrument shall send a result upload to the LIS at the time the panel is physically placed in the instrument. The instrument defaults to CHECKED.

#### 14.3.1.2.Results Upload Options

There are five results upload options, only one of which can be CHECKED at a time.

#### Solicited

Acceptable values are CHECKED and UNCHECKED. When CHECKED the instrument waits for the LIS to request the results The instrument defaults to UNCHECKED.

#### Send On Finalization

Acceptable values are CHECKED and UNCHECKED. When CHECKED the instrument shall send results to the LIS when the panel is finalized or a modification has been made to a finalized panel. The instrument defaults to UNCHECKED.

#### Send On Completion

Acceptable values are CHECKED and UNCHECKED. When CHECKED the instrument shall send results to the LIS when the panel's status transitions to COMPLETE or a modification has been made to a COMPLETE panel. The instrument defaults to CHECKED.

#### Send as Available

Acceptable values are CHECKED and UNCHECKED. When CHECKED the instrument shall send results to the LIS when the panel's status transitions to COMPLETE or the panel has partial results. Partial results are when at least one MIC value is determined for an AST or ID/AST panel or the organism ID is determined for an ID/AST panel. The instrument defaults to UNCHECKED.

#### Send at Fixed Time

Acceptable values are CHECKED and UNCHECKED. When CHECKED the instrument shall send results to the LIS when the panel's status transitions to COMPLETE and send panels with partial results to the LIS at the Fixed Time. When the Fixed Time is reached, any panel that is ONGOING and has partial results shall be uploaded to the LIS with a Test Status of INST\_PARTIAL\_COMPLETE. The instrument defaults to UNCHECKED.

#### 14.3.1.3.Communications Setup

NOTE: Modifying any of the following options will result in the instrument rebooting.

#### **Baud Rate**

Acceptable values are 2400, 4800, 9600, 14400, 19200, 38400. The instrument defaults to 9600.

#### Data Bits

Acceptable values are 7 and 8. The instrument defaults to 8.

#### Parity

Acceptable values are ODD, EVEN, and NONE. The instrument defaults to NONE.

#### **Stop Bits**

Acceptable values are 1 and 2. The instrument defaults to 1.

#### **Packed Frames**

Acceptable values are YES and NO. Selecting YES allows message frames sent to the LIS to support multiple records per frame ("packed"). When NO is selected, only one record is transmitted per frame. The instrument defaults to YES.

#### 14.3.1.4.Organism and Antimicrobial Configuration Screens

Except for antimicrobials listed in special messages and BDXpert Rules within comment fields, all referrals to organism IDs and antimicrobials in LIS communications use the LIS Codes stored in the instrument which are set to default values per Appendix C and Appendix D. These codes can be edited to a different value.

#### 14.3.2. Modes of Communications

Download refers to communications from the LIS to the instrument and upload refers to communications from the instrument to the LIS. NOTE: The total size of a message downloaded to the instrument should not exceed 100k characters.

**Note:** New in version V5.02, results for orphan panels and QC panels are not uploaded to the LIS unless the panels satisfy the criteria of an LIS query.

The BD Phoenix 100 shall support the following modes of communications with an LIS:

#### **Result Uploads**

The BD Phoenix 100 shall upload results according to the CHECKED Results Upload Option. For AST sets, several result records shall be sent in a single message. Each result record shall report the results for a single drug in the AST set. For ID/AST combo tests, an ID result record is sent as the first result record, and the AST result records follow

#### **Query Uploads**

The BD Phoenix 100 shall upload queries if the Unsolicited Queries Option is CHECKED.

#### **Order Downloads**

The BD Phoenix 100 instrument shall accept order downloads. All orders must include either a Test ID or a Sequence Number, a valid Accession number and a valid Isolate Number. An order consisting of a valid Consumable Sequence Number and valid Accession\Isolate Number shall be saved to the instrument database as a PENDING panel. If an organism ID is included with the order and the consumable sequence number is for an ID/AST combo panel, the ID side of the panel will be disabled. Orders without the Consumable Sequence Number shall be saved in the instrument, BUT must be associated to a Consumable Sequence Number via the LIS Login Screen prior to being saved to the instrument database. If an organism ID is included with the order, the ID side of the panel will have to be disabled prior to saving the panel to the database. Orders with invalid data shall be rejected by the instrument. See the Phoenix User Manual (RE: LIS Order Cancelled Messages) for more information regarding cancelled LIS orders.

If an order is received with an organism ID that is either unknown to the instrument or is an unclaimed organism, the order will still be saved to the database or saved for future association with a Consumable Sequence Number, BUT the organism ID will be replaced with Invalid Organism Received.

If an order is downloaded with a sequence number that already exists in the instrument and all populated order fields are valid, the panel record is populated/overwritten with the order fields. Modifications shall not be accepted for Finalized panels.

An order field with all spaces will be treated as "missing". Leading or trailing spaces are trimmed.

#### **Query Downloads**

The BD Phoenix 100 instrument shall accept download queries. The instrument shall accept queries on the following fields: Result Qualifier, Start Time, End Time, Request

Time Qualifier, Sequence Number, Test ID, Status and Accession. Queries with invalid data shall be rejected by the instrument. See the Phoenix User Manual (RE: LIS Query Assembly Messages) for more information regarding invalid queries.

#### 14.3.3. Message Content

The BD Phoenix 100 shall exchange fields with the LIS per the following table:

#### **Field List**

The BD Phoenix 100 shall exchange fields with the LIS per the following table:

Header Record Field Name	ASTM Pos.	Direction
Sender Name	H, 5, 1, 1	U
Version Number	H, 13, 1, 1	U
Message Date/Time	H 14, 1, 1	U

Order Record Field Name	ASTM Pos.	Direction
Accession Number	0, 3, 1, 1	U/D
Isolate Number	0, 3, 1, 2	U/D
Organism	0, 3, 1, 3	U/D
Test ID	0, 5, 1, 4	U/D
Test/Consumable Sequence Number	0, 5, 1, 5	U/D
Priority	0, 6, 1, 1	U/D
Report Type	0, 26, 1, 1	U

Result Record Field Name	ASTM Pos.	Direction
Result Type Code	R, 3, 1, 4	U
Test/Consumable Sequence Number	R, 3, 1, 5	U
Antibiotic	R, 3, 1, 6	U
Test Status	R, 4, 1, 1	U
Result Data 1		
AST MIC for AST MIC	R, 4, 1, 2	U
Result		
Organism ID for ID Result	R, 4, 1, 2	U
Result Data 2		
AST susceptibility (Final)	R, 4, 1, 3	U
Profile Number for ID Test	R, 4, 1, 3	U
Result Data 3		
Resistance Marker 1	R, 4, 1, 4	U
Result Data 4		
Resistance Marker 2	R, 4, 1, 5	U
Result Data 5		
Resistance Marker 3	R, 4, 1, 6	U
Result Data 6		
Resistance Marker 4	R, 4, 1, 7	U
Result Data 7		
Resistance Marker 5	R, 4, 1, 8	U
Resistance Marker 6	R, 4, 1, 9	U
Resistance Marker 7	R, 4, 1, 10	U
Resistance Marker 8	R, 4, 1, 11	U
Resistance Marker 9	R, 4, 1, 12	U

Result Record Field Name	ASTM Pos.	Direction
Resistance Marker 10	R, 4, 1, 13	U
Preliminary/Final Status	R, 9, 1, 1	U
Test Start Date/Time	R, 12, 1, 1	U
Result/Status Date/Time	R, 13, 1, 1	U
Test Complete Date/Time	R, 13, 2, 1	U
Instrument Type	R, 14, 1, 1	U
Instrument Number	R, 14, 1, 4	U
Instrument Location	R, 14, 1, 5	U

Comment Record Field Name	ASTM Pos.	Direction
Comment Text	C, 4, 1, 1	U
Comment Type	C, 5, 1, 1	U

Request Record Field Name	ASTM Pos.	Direction
Request Starting Accession Number	Q, 3, 1, 2	U/D
Request Starting Sequence Number	Q, 3, 1, 3	U/D
Request Test Id	Q, 5, 1, 1	D
Request Test Status	Q, 5, 1, 2	D
Request Result Qualifier	Q, 5, 1, 5	D
Request Time Qualifier	Q, 6, 1, 1	D
Starting Date/Time	Q, 7, 1, 1	D
Ending Date/Time	Q, 8, 1, 1	D

Terminator Record Field Name	ASTM Pos.	Direction
Termination Code	L, 3, 1, 1	U/D

## **Field DescriptionsPatient Fields**

BD Phoenix 100 does not support patient demographics and therefore shall send an empty Patient record.

## **Order Fields**

Accession Number (0, 3, 1, 1) - Maximum field length: 20 characters. A unique alphanumeric string that identifies a specimen.

**Isolate Number (O, 3, 1, 2) -** Maximum field length: 2 characters. Allowable range: 1-20. The number associated with an isolate.

**Organism** (**O**, **3**, **1**, **3**) - Maximum field length: 20 characters. LIS code of the organism ID. The organism ID for an ID panel or an ID/AST panel is the User ID if it exists or if a User ID does not exist and the panel has a single Instrument ID it is the Instrument Organism ID. The organism ID for an AST panel is the User ID if it exists or if a User ID does not exist and the panel has been auto associated it is the Instrument Organism ID. Organism IDs and their corresponding LIS codes can be viewed/edited in the instrument's Organism Configuration Screen

For QC Panels the organism ID shall be the Test Strain.

**Test ID** (**O**, **5**, **1**, **4**) - Maximum field length: 20 characters. Populated with the panel format abbreviation as shown on the panel's barcode label. Appendix B contains a sample list.

**Test/Consumable Sequence Number (O, 5, 1, 5)** - 12 digit numeric string identifying the instrument consumable.

**Priority** (**0**, **6**, **1**, **1**) - Maximum field length: 1 character. This field is defined in the ASTM E\_1394 specification. Currently only the values 'A' for Critical, 'R' for Normal and blank for default normal or no change are supported.

**Report Type (O, 26, 1, 1)** – This field is defined in the ASTM  $E_{1394}$  specification. When a cancelled order is sent back to the LIS the report type is 'X'.

#### **Result Fields**

The BD Phoenix 100 uploads shall consist of AST results and ID results. The information contained in the generic "Data Fields" depends on the type of result being reported. AST Result records contain antimicrobial and susceptibility information. ID Result records contain organism and Resistance Marker information.

**Result ID Code (R, 3, 1, 4)** A BD defined code that indicates the type of information in the result record. The keyword **AST\_MIC** indicates results for a MIC based Antimicrobial Susceptibility Test and the keyword **ID** indicates identification results.

**Test/Consumable Sequence Number** ( $\mathbf{R}$ ,  $\mathbf{3}$ ,  $\mathbf{1}$ ,  $\mathbf{5}$ ) – 12 digit numeric string identifying the instrument consumable. Antimicrobial ( $\mathbf{R}$ ,  $\mathbf{3}$ ,  $\mathbf{1}$ ,  $\mathbf{6}$ ) (<u>*AST Results*</u>) **Populated** with the LIS code corresponding to the antimicrobial. Antimicrobials and their corresponding LIS codes can be viewed/edited in the instrument's Antimicrobial Configuration Screen. This field can be up to 20 characters long.

**Test Status LIS Code (R, 4, 1, 1)** For non QC panels this field is populated with one of the statuses listed in Appendix B. For QC panels that are ONGOING or PENDING, the status is reported as for non QC panels, however, for COMPLETED panels the status is INST\_QC\_PASS or INST\_QC\_FAIL.

## **Result Data Field 1**

The contents of the Result Data fields vary depending on the type of result being reported, as described below.

**Minimum Inhibitory Concentration (R, 4, 1, 2)** (<u>*MIC based AST Result*</u>) For AST tests that produce MIC values; this field contains the minimum antibiotic concentration that inhibits growth of the tested organism. This field can be up to 20 characters long and is assumed to contain a number in ug/ml.

This field may contain signed MIC values such as "<=4" or ">8", MIC values for compound antimicrobials such as "0.5/4" or "<=0.5/16" as well as the following:

"?" - Ongoing

"C" - Antimicrobial is Rapid Completed (*For nonQC tests in V4.01 and later*) "X" - Error

Note: For QC panels, MIC values of X will be uploaded to the LIS for V4.01. The uploaded MIC values for QC panels are 'blank' in previous software versions.

**Organism** (**R**, **4**, **1**, **2**) (<u>*ID Results Only*</u>) LIS code of the organism ID. The organism ID for an ID panel or an ID/AST panel is the User ID if it exists or if a User ID does not exist and the panel has a single Instrument ID it is the Instrument Organism ID. The organism ID for an AST panel containing a resistance marker, otherwise the organism ID

is only included in the order record. Organism IDs and their corresponding LIS codes can be viewed/edited in the instrument's Organism Configuration Screen. This field can be up to 20 characters long.

## **Result Data Field 2**

**AST Susceptibility, Final (R, 4, 1, 3)** (<u>*AST results only*</u>) This is a code that indicates the organism's susceptibility to the antibiotic specified in this record. The acceptable values for this field are, blank, S, I, R, N, X representing MIC is pending, susceptible, intermediate, resistant, not susceptible and error respectively.

## **Result Data Field 3**

**Resistance Marker 1 (R, 4, 1, 4)** (*ID results*) This represents a Resistance Marker associated with the organism identified in the ID result record. This field can be up to 8 characters long. Examples of Resistance Markers and their corresponding LIS codes are listed below.

Extended Spectrum B-Lactamase	RM_ESBL
Methicillin Resistant Staphylococcus	RM_MRSA
Streptomycin HLAR	RM_HLSR
B-Lactamase in Gram Positive Cocci	RM_GP_BL
Vancomycin Resistant Enterococci	RM_VRE
Gentamicin HLAR	RM_HLGR
High Level Kanamycin Resistant	RM_HLKR
Streptococcus MLSb Phenotype	RM_MLSB
Streptococcus Macrolide Efflux Phenotype	RM_MEFF
High Level Penicillin Resistant S. Pneumoniae	RM_HLPRSF
Low Level Penicillin Resistant S. Pneumoniae	RM_LLPRSP
High Level Mupiricin Resistant Staphylococcus	RM_HLMUP

## **Result Data Field 4**

**Resistance Marker 2 (R, 4, 1, 5)** (*ID results*) This represents a Resistance Marker associated with the organism identified in the ID result record. This field can be up to 8 characters long. Examples of Resistance Markers and their corresponding LIS codes are listed under **Result Data Field 3**.

## **Result Data Field 5**

**Resistance Marker 3 (R, 4, 1, 6)** (*ID results*) This represents a Resistance Marker associated with the organism identified in the ID result record. This field can be up to 8 characters long. . Examples of Resistance Markers and their corresponding LIS codes are listed under **Result Data Field 3**.

**Resistance Marker 4-10 (R, 4, 1, 7-13)** (<u>*ID results*</u>) This represents a Resistance Marker associated with the organism identified in the ID result record. This field can be up to 8 characters long. Examples of Resistance Markers and their corresponding LIS codes are listed under **Result Data Field 3**.

**Preliminary/Final Status** (**R**, **9**, **1**, **1**) This field contains either a "**P**" for preliminary status or an "**F**" for final status, which occurs when the panel is finalized at the instrument.

**Start Date/Time (R, 12, 1, 1)** This is the date and time that the panel was physically placed in the instrument. This field is represented in the YYYYMMDDHHMMSS format.
**Result/Status Date/Time (R, 13, 1, 1)** This is the date and time that the panel's status transitioned to COMPLETE. This field is represented in the YYYYMMDDHHMMSS format.

**Test Complete Date/Time (R, 13, 2, 1)** (*<u>ID results</u>) This is the date and time that the ID panel obtained an ID. (<u>AST results</u>) This is the date & time that a drug obtained a valid MIC. This field is represented in the YYYYMMDDHHMMSS format.* 

Instrument Type (R, 14, 1, 1) Identifies the instrument with the keyword PHOENIX.

Instrument Number (R, 14, 1, 4) Instrument number between 1 and 99.

**Instrument Location (R, 14, 1, 5)** Indicates the panel position inside the instrument as a 3 character string represented in TierStation format. Tier values are A-D and station values are 1-25. This field is empty for PENDING panels.

Request Fields**Starting Access Number (Q, 3, 1, 2)** - Maximum field length: 20 characters. This field should be populated if the request is for either a single specimen or for a range of specimens. If accession number is not to be used as a search criterion for requested data, then this field can be left blank. Populating this field with the keyword ALL queries for all panels in the instrument database that meet the remaining criteria.

**Starting Sequence Number (Q, 3, 1, 3)** - Required field length: 12 digit consumable ID value. This field should be populated if the request is for a single panel. If sequence number is not to be used as a search criterion for requested data, then this field can be left blank. Populating this field with the keyword ALL queries for all panels in the instrument database that meet the remaining criteria.

**Test ID** (**Q**, **5**, **1**, **1**) - Maximum field length: 20 characters. This field should be populated with the test type (ID, AST\_MIC). The BD Phoenix 100 accepts the keywords **ID** and **AST\_MIC** as valid test types as well as the pre-defined test names. See appendix B for examples. Populating this field with the keyword **ALL** queries for all panels in the instrument database that meet the remaining criteria.

**Test Status** (**Q**, **5**, **1**, **2**) The BD Phoenix 100 instrument accepts queries for panels with a status as follows:

- **INST\_ONGOING**, panels with an onging status that may or may not yet contain results.
- **INST\_COMPLETE**, panels with a complete, rapid complete, in attention ignored, in attention complete, QC pass, or QC fail status
- **INST\_RAPID\_COMPLETE**, panels with a rapid complete status
- **INST\_PARTIAL\_COMPLETE**, panels with an onging status that have obtained results.
- INST\_QC\_PASS, QC panels with a passed QC status
- **INST\_QC\_FAIL**, QC panels with a failed QC status

**Result Qualifier** (**Q**, **5**, **1**, **5**) The only acceptable value for this field is the keyword **MOD** to request only results that have been modified since the last request.

**Time Qualifier** (Q, 6, 1, 1) - Maximum field lenth: 1 character. The acceptable values for this field are 'S' which indicate the following date time fields refer to test start times or '**R**' which indicate the following date time fields can refer to result/status times.

**Starting Date/Time (Q, 7, 1, 1)** The starting date/time (inclusive) of the data requested represented in the YYYYMMDDHHMMSS format.

Ending Date/Time (Q, 8, 1, 1) The ending date/time (inclusive) of the data requested represented in the YYYYMMDDHHMMSS format.

#### **Comment Fields**

The BD Phoenix 100 sends comment strings for BdXpert rule text and special messages.

The following is an example of a comment record containing a rule where <310> is the rule number and (AMX, ATM, CAZ) is a list of the affected antimicrobials.

## C|1| |<310> BDXpert Rule 310 text.(AMX, ATM, CAZ)|E

Special Messages are messages that indicate a special condition for a BD Phoenix 100 panel.

The following is an example of a comment record containing a special message with a list of the affected antimicrobials.

## C|1| | Special message text.(AM, CAZ)|T

**Comment Text** (C, 4, 1, 1) – The text to be used for the patient, specimen or isolate comment. This field can be up to 1600 characters long.

**Comment Type** (C, 5, 1, 1) – The type of comment record. This field should be an E, or T for BDXpert rule, or special message comments respectively.

#### **Terminator Field**

General

### 14.3.4. Example ASTM 1394 Protocol

### **Result Upload Examples**

#### Example of a rejected order

H|\^&|||Becton Dickinson||||||||V1.0|20031110093857

P|1

C|1||LIS Order Cancelled: Invalid Accession Number Field|T

L|1|N

#### Example of a "Send When Placed in Instrument" result upload

H\\^&|||Becton Dickinson||||||||V1.0|20031110101102

P|1

O|1|IDAST 1^1||^^^GNIDAST 951^429510000001|R

R|1|^^^ID^429510000001|INST\_ONGOING|||||P|||20031110101102||PHOENIX^^1^C7

 $\label{eq:result} R|2|^{\wedge\wedge}AST_MIC^{4}29510000001^{\wedge}AM|INST_ONGOING^{?}^{\wedge}|||||P||| \\ 20031110101102||PHOENIX^{\wedge\wedge}1^{\wedge}C7$ 

R|3|^^^AST\_MIC^429510000001^AN|INST\_ONGOING^?^ |||||P||| 20031110101102||PHOENIX^^1^C7

R|4|^^^AST\_MIC^429510000001^AMC|INST\_ONGOING^?^ ||||||P||| 20031110101102||PHOENIX^^1^C7

L|1|N

## Example of a result upload for an ID panel

H|\^&|||Becton Dickinson||||||||V1.0|20031110102747

P|1

O|1|ID 1^1^ALCPIE||^^^GNID 952^429520000001|R

 $\label{eq:rescaled} R|1|^{\wedge\wedge}ID^{4}2952000001|INST_COMPLETE^{ALCPIE}|||||P|||20031110101102|20031110102747|20031110102747|PHOENIX^{\wedge\wedge}1^{A}D7$ 

L|1|N

# Example of result uploaded to an LIS with the Send Interpretation Results option UNCHECKED

H|\^&|||Becton Dickinson||||||||V1.0|20031110114736

P|1

O|1|IDAST 1^1^SHISPE||^^^GNIDAST 951^429510000001|R

R|1|^^^ID^429510000001|INST\_COMPLETE^SHISPE|||||P|||20031110112648| 20031110114736\20031110114735|PHOENIX^^1A7

R|2|^^^AST\_MIC^429510000001^AM|INST\_COMPLETE^<=4^S|||||P||| 20031110112648|20031110114736\20031110114735|PHOENIX^^1A7

R|3|^^^AST\_MIC^429510000001^AN|INST\_COMPLETE^<=4^S|||||P||| 20031110112648|20031110114736\20031110114735|PHOENIX^^1^A7

L|1|N

# Example of a result upload for an ID/AST panel with special messages, resistance markers and the Send Interpretation Results option UNCHECKED

H|\^&|||Becton Dickinson||||||||V1.0|20031110150803

P|1

O|1|ABC^1^ENTCFAA||^^^CT01P^424940000029|R

C|1||The MICs for this antibiotic and species combination are not reported by the Phoenix system. An alternate method should be utilized.(RA)|T

 $C|2||Fill failures were detected with this antibiotic and no MIC can be determined. The isolate should be retested.(CF)|T <math display="inline">\,$ 

R|1|^^^ID^424940000029|INST\_IN\_ATTN\_COMPLETE^ENTCFAA^^**RM\_VRE^RM** \_**HLSR^RM\_HLGR**|||||P|||20031110145645|20031110150803|PHOENIX^^1C5

R|2|^^^AST\_MIC^424940000029^AM|INST\_IN\_ATTN\_COMPLETE^>32|||||P|||200311 10145645|20031110150803\20031110150802|PHOENIX^^1^C5

 $\label{eq:rescalar} R|4|^{\wedge\wedge}AST_MIC^{424940000029}CAZ|INST_IN_ATTN_COMPLETE^{>}64|||||P|||20031110145645|20031110150803|20031110150802|PHOENIX^{\wedge\wedge}1^{C5}$ 

L|1|N

## Query Upload Examples Example of an Unsolitcited Query uploaded due to a missing organism id

H|\^&|||Becton Dickinson||||||||V1.0|20031110151943

Q|1|^InvOrg^429530000072

L|1|N

## **Order Download Examples**

Example of a download order for a critical panel

 $H|^{k}||$ 

P|1

O|1|Critical^1||^^GNID 952|A

L|1|N

## **Query Download Examples**

For test start times between Nov 10,2003 at 09:00:00 and Nov 10,2003 at 16:00:00 H|\^&

Q|1||||S|20031110090000|20031110160000

L|1|N

## For test result times after Nov 10,2003 at 09:00:00

H|\^&

Q|1||||S|20031110090000||

L|1|N

For panels that have partial results and have been modded since the last request  $H|\backslash^{A}$ 

Q|1|||^INST\_PARTIAL\_COMPLETE^^^MOD L|1|N **For the panel with 429530000072 sequence number** H|\^& Q|1|^^42953000072|| L|1|N **For ALL accession numbers** H|\^& Q|1|||ALL||| L|1|N