

BD

Lab



Microbiology News & Ideas

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BD

Helping all people
live healthy lives

BD BACTEC™ Plus Media – Exceptional Performance and Positive Financial Impact

In response to new healthcare laws, changes to our healthcare system have become more and more evident with patient outcomes moving into the spotlight. As laboratory managers continue their focus on budgets, it is important to understand the advantages of using BD BACTEC Plus media in this new and changing environment. The decision to implement the BD BACTEC Plus media containing resins, in many cases, can be justified because of the exceptional product performance compared to non-resin media, the resulting patient outcome improvement and by the positive financial impact to a healthcare facility.¹ Another aspect to consider when making this decision is BD's extensive experience in resin and media development.



Resin History

Resin media were introduced to the microbiology laboratory in the early 1980s. Marion Scientific was one of the first on the market with an antimicrobial removal device (ARD), which could be used with blood culture systems. Shortly thereafter, BD improved upon this method by incorporating cationic (positively charged) and anionic (negatively charged) resin beads directly into the culture medium, simplifying the process. The beads capture antimicrobials, allowing the microbes to recover, grow and be detected by BACTEC instruments.²

In 1988, BACTEC Plus media (Aerobic and Anaerobic) were introduced to address the need to culture higher volumes of blood per draw and, thus, improve organism recovery.³ To compensate for the lower blood to broth dilution ratios compared to BACTEC Standard media, the concentration of sodium polyethanol sulfonate (SPS) was increased to encourage organism growth,⁴ and resins were added for neutralization of antimicrobials.² One year later, BACTEC Peds Plus™ medium was introduced containing resins, increased nitrogenous compounds and lower amounts of SPS to facilitate growth of pathogens.

Most recently, the BACTEC Plus Aerobic medium was enhanced to facilitate the recovery of yeasts and, specifically, *Candida glabrata*. As a result, these organisms may be detected within 48 hours of incubation.⁵ Our “resin experienced” R&D team is consistent in their move forward, dedicated

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BD BACTEC™ Plus Media

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to providing high quality blood culture media performance to our customers and, ultimately, to our patients. These significant, impactful accomplishments are in line with BD's purpose of *Helping all people live healthy lives*.

How BD Resins Work

The resins (also referred to as polymers) utilized in BACTEC Plus media are produced through a process called polymerization, which combines many small molecules or monomers into a covalently bonded chain to create a large macromolecule or polymer. The monomers selected for polymerization, and specific control of the polymerization process, provide the functional properties of the resulting polymer. Resins function by adsorbing antimicrobials in solution, thereby lowering the concentration of the antimicrobial in the medium.²

Not all resins and polymers are created equal. Inside BACTEC Plus bottles there are two types of resin beads.

The dark cation exchange resin beads form a strong ionic bond with positively charged antimicrobials. The lighter hydrophobic resin beads, also referred to as polymeric adsorbents, adsorb antimicrobials by van der Waals forces. The hydrophobic resins in BACTEC media bind to the hydrophobic regions of the antimicrobial. It is the use of both types of resin beads that allows BACTEC Plus media to neutralize such a large menu of antimicrobials including aminoglycosides, penicillins, cephalosporins and vancomycins.^{2,6} Once the molecular bond between the resin bead and the antimicrobial is established, their antimicrobial properties are neutralized. Neutralization now allows the growth of the microorganism in the blood culture bottle. The net effect of using these resins to neutralize antimicrobials is an increase in the number of positive blood cultures.¹ The ability to recover an organism and achieve a positive blood culture in the presence of antimicrobials is of extreme importance because 29% to 36% of patients are under antimicrobial therapy at the time of their initial blood culture test.^{7,9}

Financial Impact

Resins help to increase the number of positive blood cultures and in many cases prove to have a positive financial impact for a healthcare facility.¹ A positive blood culture provides an organism for identification and susceptibility testing. Identification and susceptibility testing allows the clinician to target a more directed therapy resulting in a higher rate of success.⁷

Another impact of the increase in recovery from using resin-containing media is the potential reimbursement from a DRG (Diagnostic Related Group)-based prospective payment schedule. A positive blood culture may allow healthcare facilities to



bill for a diagnosis of septicemia versus fever of unknown origin. The difference in reimbursement for these two conditions can be greater than \$5,000 in some payment schedules. Whittier¹ reported an increase of \$1,700,000 in DRG reimbursements in a 12-month period after standardizing on the BACTEC 9240 instrument and using BACTEC Plus Aerobic resin medium and the corresponding Lytic Anaerobic medium. Whittier had previously used other automated blood culture systems and did not use a medium containing resins as an antimicrobial removal system.

Summary

As you can see, the use of BD BACTEC Plus media is not only Best Practice for both the laboratory and patient care, but in many cases can also have a significant, positive financial impact.

For more information on BD BACTEC Plus media or for a copy of the Whittier white paper, mark the appropriate box(es) on the reader response card.

REFERENCES

- 1 Whittier et al. 2003. Financial impact of blood culture system consolidation and media selection. Meridian Health System, Neptune, NJ, ASM, 2003.
- 2 Flayhart et al. 2007. J. Clin. Microbiol. 45:816-821.
- 3 Clinical and Laboratory Standards Institute. 2007. Approved Guideline, M47-A. Principles and procedures for blood cultures, CLSI, Wayne, PA.
- 4 Washington, J.A. 1978. The detection of septicemia. CRC Press, Inc.
- 5 Crowther and Beatty. 2009. Evaluation of the BACTEC FX instrument and a modified BACTEC Plus aerobic medium. ASM, 2009, Abstr. C-073.
- 6 Flayhart et al. 2005. Ability of BD BACTEC Plus blood culture bottles versus BacT/Alert FAN blood culture bottles to detect bacterial pathogens in samples containing therapeutic levels of cefoxitin and piperacillin/tazobactam. ICAAC, 2005.
- 7 Weinstein et al. 1997. Clin. Infect. Dis. 24:584.
- 8 Jorgensen et al. 1997. J. Clin. Microbiol. 35:53.
- 9 Rohner et al. 1997. J. Clin. Microbiol. 35:2634.



Special Offer
BD currently has a program allowing BACTEC users who are not using Plus Media the ability to evaluate resin media at no additional cost. Please contact your local BD sales representative to learn more about this program.

In Case You Missed It

The Fall issue of *BD LabO*™, Vol. 21, No. 3 (which was only available digitally), contained several articles on the BD BACTEC™ Blood Culture System. Summarized below are the highlights of these articles.



Anaerobic Blood Cultures Revisited – AGAIN?



Christine Biggs, the Microbiology Supervisor at The Chester County Hospital in Pennsylvania, described her lab's experience using the BD BACTEC™ FX Blood Culture System, stressing the importance of including an anaerobic bottle in a blood culture set. After switching from the

bioMérieux BacT/ALERT® system to the BACTEC FX system in 2009, she compared the data generated by both systems. During a single year's time, 924 significant isolates were recovered with BACTEC FX – over 100 more than with the BacT/ALERT system. Even more dramatic was the difference in recovery of anaerobes. BACTEC FX recovered 49 significant anaerobes compared to only 16 for BacT/ALERT. The lab used a two-bottle set per blood culture (BACTEC Plus Aerobic/F and BACTEC Lytic/10 Anaerobic/F media) and the majority of the recovered anaerobic isolates only grew in the BACTEC Lytic Anaerobic medium.

Also included in the article were three case studies that showed appropriate patient treatment was only achieved by using the results of the anaerobic blood culture bottles. In one situation, *Bacteroides fragilis* was isolated from a BACTEC Lytic Anaerobic bottle from a patient who had undergone an appendectomy. Even though no apparent abscess or perforation was seen during surgery, the original perioperative antibiotic therapy failed to address what the anaerobic blood culture finally showed – the infected appendix had leaked anaerobes into the blood.

Ms. Biggs summarized her article by stating, “based on the results of our BACTEC Lytic Anaerobic cultures and the case studies in which the appropriate antibiotic was not started until the anaerobe was identified, we will continue to use the BACTEC Lytic Anaerobic bottle in our blood culture sets.”

To view the complete articles, visit www.bd.com/ds/LabO and download the Fall 2010 issue.

BD BACTEC Success Story

The Community Medical Center in Toms River, N.J., loyal BD BACTEC users for 17 years, presented a case study that required the CDC's assistance. A set of two bottles (BACTEC Plus Aerobic/F and BACTEC Lytic/10 Anaerobic/F) from an 87-year-old patient with recurring chills, syncope, and abdominal pain were flagged as positive. Gram stains from the bottles appeared to be negative; however, blood agar and chocolate plates revealed a fine film of growth after 48 hours incubation in CO₂. Previous admission results and further testing indicated *Campylobacter*; however, a motility test revealed tight little coils, a morphology not typically seen in *Campylobacter*. Samples were sent to the CDC and after several months a report of *Campylobacter fetus* subsp. *fetus* with mixed morphology was issued. A second bacterium was also recovered and identified as *Campylobacter coli*.



Left to Right: Alice Phelps, Bobbi Billings, Judy Stavitz, Rita Cline, Diane Schunk, Lynn Liverakos and Joy Stewart



Campylobacter fetus subsp. *fetus*
Photo Courtesy of CDC

New BD BACTEC Study

Recovery of *S. aureus* from Patients with Suspected Persistent Bacteremia*^f



Patients with *Staphylococcus aureus* bloodstream infections may develop persistent bacteremia (PB) due to deep-seated infections such as endocarditis,

osteomyelitis, abscesses, etc. However, patients with PB can be difficult to diagnose because appropriate antimicrobial therapy has been initiated, which may interfere with organism recovery. Researchers at the Summa Akron City Hospital in Akron, Ohio, compared the ability of both the BACTEC Plus Aerobic/F and VersaTREK REDOX 1® media to detect PB due to *S. aureus*. “VersaTREK REDOX 1 bottles contain 80 mL of media and rely on specimen dilution to minimize this potential antimicrobial effect while BACTEC Plus Aerobic/F media contains resins designed to adsorb/inactivate antimicrobials.”*

Twenty patients with *S. aureus* bloodstream infections were tested (10 grew MRSA and 10 grew MSSA). Blood cultures were drawn after 4 to 7 days of antimicrobial therapy, mid-

way in the dosing cycle. One aerobic bottle from each system was collected from two different sites (4 bottles total). Each bottle was inoculated with 10 mL of blood, alternating the bottles to minimize sample bias. Results were as follows:

- BACTEC Plus Aerobic/F bottles detected *S. aureus* PB in 5/20 cases (25%) with a mean time to detection of 21.09 hours.
- VersaTREK REDOX 1 bottles failed to recover *S. aureus* from any of the 20 cases (0%).

Furthermore, of the five cases where *S. aureus* was detected in the BACTEC medium, two were MRSA from patients on daptomycin, two were MRSA from patients on vancomycin, and one was MSSA from a patient on nafcillin.

Although the sample size was limited and only aerobic bottles from each system were tested, BACTEC Plus Aerobic/F medium was superior to the VersaTREK REDOX 1 medium for recovery of *S. aureus* in patients with persistent bacteremia.

* DiPersio, J. and H. Bonilla. 2010. Comparison of BACTEC™ Plus Aerobic/F and VersaTREK REDOX 1® Blood Culture Media for the Recovery of *S. aureus* from Patients with Suspected Persistent Bacteremia. Presented at the 100th General Meeting of the American Society for Microbiology, Poster C-1134, San Diego, Calif., 23 to 27 May 2010.

^f Study was supported by BD Diagnostics.

The BD BACTEC™ Culture Club

A record 12 new members joined the BACTEC Culture Club and were printed in the Fall 2010 issue of *BD LabO*. The new members comprised a wide range of organisms submitted from all over the world. At this time we are pleased to welcome four new members.

Laboratory Site	Underlying Disease/ Diagnosis	BACTEC Instrument	BACTEC Media*	Time to Detection	Organism Detected
Kinderspital Zürich Zürich, Switzerland	Leukemia	FX	Peds Plus™ Aerobic/F	48 hours	<i>Streptococcus parasanguinis</i>
Labor Männedorf, Männedorf, Switzerland	Pneumonia	9050	Plus Aerobic/F	125 hours	<i>Francisella tularensis</i> subsp. <i>tularensis</i>
	Pneumonia	9050	Plus Aerobic/F	140 hours	<i>Plantibacter flavus</i>
RWTH Aachen University Hospital Aachen, Germany	Unknown	FX	Plus Anaerobic/F	48 hours	<i>Peptostreptococcus stomatis</i>

* BD Diagnostics does not claim recovery of the isolates listed in the table with the associated media. See package inserts for the expected organism recovery.

Why don't you "join" the club?

If you have an unusual organism isolated from any of the BD BACTEC fluorescent series instruments (9240, 9120, 9050, 9000MB and FX), see if it is listed on the BACTEC Culture Club form posted on our web site www.bd.com/ds/CultureClub. If it's not listed, complete the form and send it in! New submissions may be printed in future issues of *BD LabO*.

Introducing the New Integrated BD-Bruker Microbiology System The Results of Tomorrow *Today*

BD Diagnostics and Bruker Daltonics Inc., a subsidiary of Bruker Corporation, have entered into an international co-development and co-marketing collaboration that will promote an emerging, integrated approach to bacterial and yeast identification and antimicrobial susceptibility testing. This new approach has the potential to transform how traditional microbiology has been performed for decades.

Through this collaboration, identification of microorganisms will be performed with the Bruker MALDI Biotyper, a mass spectrometry-based proteomic “fingerprinting” system specifically configured for rapid identification of bacteria and yeast. The MALDI Biotyper is available in a clinical version with IVD-CE mark in Europe and in the United States Bruker intends to seek FDA clearance.

BD and Bruker intend to combine the MALDI Biotyper microbial ID system with automated antimicrobial susceptibility testing on the BD Phoenix™ Microbiology System. The BD EpiCenter™ Microbiology Data Management System, which will manage patient data from both the identification and the susceptibility test systems, will facilitate this industry-first integrated approach.

The MALDI Biotyper – BD EpiCenter software integration will be further developed to optimize workflows for rapid MALDI Biotyper pathogen identification directly on positive blood cultures from the BD BACTEC™ Blood Culture System. This rapid blood culture-to-ID workflow is currently under development and will utilize Bruker’s new MALDI Sepsityper™ consumables kit.

Two Worldwide Leaders in Microbiologic Solutions...

MALDI Biotyper

The Bruker MALDI Biotyper is a widely used mass spectrometry method for microbial identification. Bruker has over thirty years of mass spectrometry experience and a broad foundation of scientific and engineering expertise in the field of MALDI-TOF. This expertise led to the development and 2007 launch in Europe of MALDI-TOF systems for

clinical microbiology applications. In addition, with over 5,000 mass spectrometry instruments placed worldwide, Bruker has an established and experienced service network. The

Bruker MALDI Biotyper allows highly accurate, rapid and cost-effective identification through a process in which organisms are identified by the unique spectrum of the major proteins and peptides that constitute their makeup. The Bruker MALDI Biotyper system has been proven accurate in over 50 peer-reviewed publications for both colony and positive blood culture applications. The MALDI Biotyper system provides rapid and robust identification of nearly 2,000 species including gram-positive, gram-negative, yeast and anaerobic bacteria. Bruker, in partnership with worldwide sentinel sites in the fields of clinical, veterinary, environmental and food sectors, continuously extends their microbial identification database capabilities. For more information about Bruker Daltonics and Bruker Corporation (NASDAQ: BRKR), visit www.bdal.com and www.bruker.com.

BD Microbiology Systems

BD microbiology systems are used around the world, delivering high quality solutions to today’s infectious disease diagnostic challenges. By combining true MIC detection, sophisticated resistance marker detection and flexible expert system analysis, the Phoenix-EpiCenter combination accurately detects emerging antimicrobial resistance. Compatibility of BACTEC media with the MALDI Biotyper delivers rapid detection and identification of blood stream pathogens. Similarly, regional centers are evaluating BACTEC™ MGIT™ compatibility with Biotyper for rapid identification of mycobacteria.

Now Working as One

Total System Approach

The integration of MALDI Biotyper, BACTEC, and Phoenix through EpiCenter provides an efficient link of rapid, accurate results for use by both high and medium volume laboratories. The EpiCenter integration ensures that the rapid MALDI Biotyper identification is efficiently linked to the corresponding rapid Phoenix susceptibility results and securely transferred to the institution’s laboratory information system.

*The Innovation that’s transforming microbiology.
The Integration that makes it work.*



PRODUCT Highlights

Now Available – BBL™ CHROMagar® MRSA II



BD is pleased to announce FDA clearance of the new BBL CHROMagar MRSA II – a next generation selective and differential chromogenic medium designed for the qualitative direct detection of methicillin-resistant *Staphylococcus aureus* (MRSA) in nasal specimens. This new product builds upon the proven performance of our first generation BBL CHROMagar MRSA medium

by delivering an easier and more flexible^{1,2*} method for detection of MRSA.

The BBL CHROMagar MRSA II medium may improve overall laboratory efficiency by delivering **enhanced performance, faster turnaround time, and a flexible reading range (20-26 hours)**,^{3,4*} Larger colonies and a stronger mauve color^{3*} also make results interpretation easy and enable CHROMagar MRSA II to be integrated into any routine laboratory workflow.

BBL CHROMagar MRSA II was evaluated by three geographically diverse clinical laboratories with surveillance specimens collected from anterior nares. Performance of BBL CHROMagar MRSA II (CMRSA II) was as follows:¹

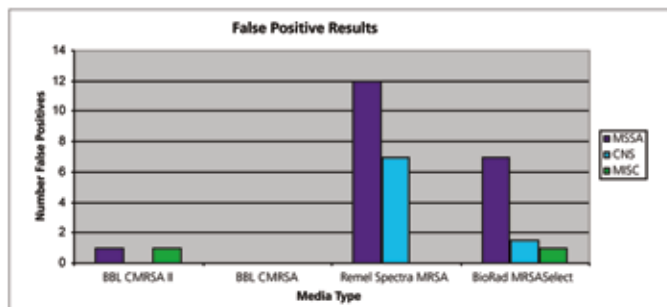
CMRSA II Result	Cefoxitin Disk		Total
	MRSA	Not MRSA	
MRSA	149	1	150
Not MRSA	13	1024	1037
	162	1025	1187

Reference Method: Cefoxitin Disk
 Positive Percent Agreement: 92% (86.7%, 95.7%)
 Negative Percent Agreement: 99.9% (99.5%, 100%)

In a poster presented by Ritter et al. at the General Meeting of the American Society for Microbiology held last year, BBL CHROMagar MRSA II was compared to BBL CHROMagar MRSA, Remel Spectra™ MRSA and BioRad MRSASelect™ for recovery of MRSA and non-MRSA strains. Both BBL CHROMagar MRSA II and BBL CHROMagar MRSA yielded statistically better agreement with non-MRSA strains than Remel Spectra MRSA or BioRad MRSASelect. Results are summarized below.⁴

Organism Test Battery

<i>mecA</i> pos MRSA	n = 100
<i>mecA</i> neg <i>S. aureus</i>	n = 38
Coagulase negative staphylococci	n = 29
Miscellaneous organisms (gram-negative rods, yeast, streptococci and enterococci, etc.)	n = 33



BBL CHROMagar MRSA II offers customers a rapid, cost-effective approach in situations where molecular testing is not an option for MRSA surveillance. In addition, it will complement BD's broad portfolio focused on the detection, surveillance and management of MRSA (i.e., BD GeneOhm™ MRSA ACP and BD Protect™).

For more information on BBL CHROMagar MRSA II contact BD Technical Services at 800.638.8663, or visit our web site at www.bd.com/geneohm.

Cat. No.	Description	Qty/Pkg
215228	BBL™ CHROMagar® MRSA II	20 plates
215229	BBL™ CHROMagar® MRSA II	100 plates

* Compared to BBL CHROMagar MRSA

REFERENCES

- BBL CHROMagar MRSA II package insert, BD Diagnostics.
- BBL CHROMagar MRSA package insert, BD Diagnostics.
- Denys, G.A. et al. ASM 2010, Abstr. C-1138.
- Ritter, V. et al. ASM 2010, Abstr. C-1146.

PRODUCT Highlights

BD BBL™ Crystal™ Identification Systems Software Update



We are pleased to announce the release of a new version of BBL™ Crystal™ MIND software (V5.05A). The new version has the following features:

- Enlarged screens for improved readability
- The elimination of default off-line test results to ensure accurate off-line test input
- Improved data entry view for ease of use
- Extended view window of historical test results for easier data search

The new software can be downloaded from our web site at www.bd.com/ds/CrystalMIND. Users who have previously downloaded the software do not need to reinstall the ODBC database driver. New users will need to install the software and ODBC database driver.

BBL Crystal MIND software is compatible with Microsoft® Windows® 95/98, 2000, NT and XP operating systems. The software cannot be directly installed on the Windows 7 platform; however, it can be operated via XP mode using Windows Virtual PC. Windows Virtual PC is an optional component from Microsoft that creates and runs a “virtual machine” for application compatibility. Windows Virtual PC allows you to run multiple Windows environments, such as Windows XP Mode, from your Windows 7 desktop. Windows XP Mode allows older programs to run that will not run or install in Windows 7. After starting up the Windows 7 computer, the user launches “XP Mode” which runs in a window under Windows 7. Crystal MIND is launched from within this window.

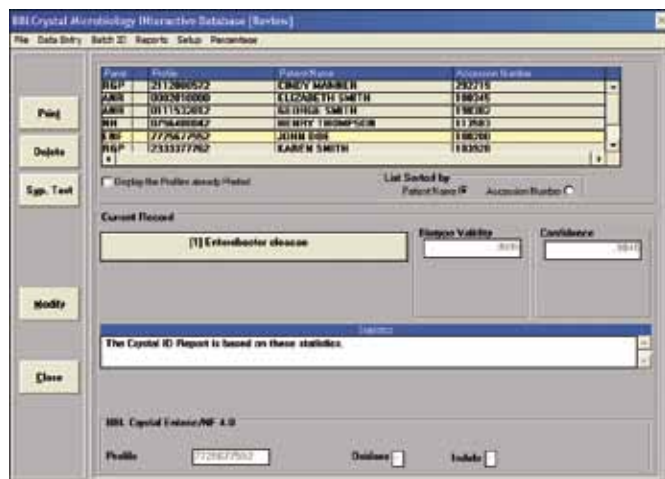
The requirements for installing Crystal MIND using Windows 7 are as follows:

- Windows XP Mode and Windows Virtual PC are only available on Windows 7 Enterprise, Windows 7 Professional and Windows 7 Ultimate. If you are running another version of Windows 7, you can visit the following site to learn more about upgrading to Enterprise, Professional or Ultimate: <http://windows.microsoft.com/en-us/windows7/products/windows-anytime-upgrade>
- You must have internet access on the computer where Crystal MIND will be installed.
- A 1 GHz 32-bit/64-bit processor is required
- 2 GB of memory (RAM) or higher is recommended
- 15 GB of hard disk space is recommended to install and run Windows XP Mode/Windows Virtual PC

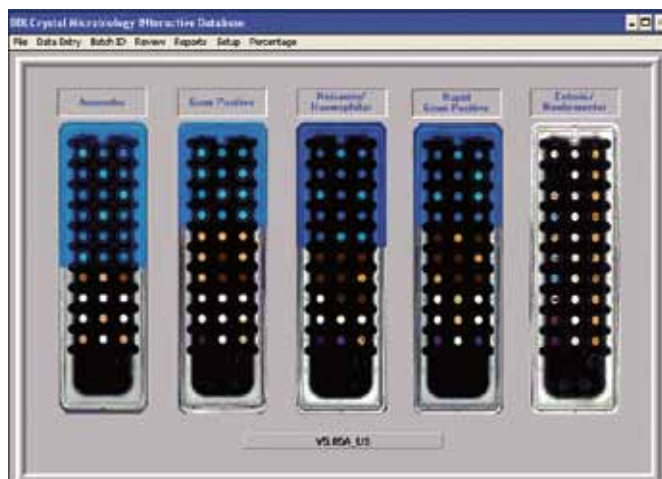
To assist you in installing the new software and operating the Crystal ID system, the following resources are available on the BD web site:

- Step-by-step instructions on how to operate Crystal MIND software using Windows 7
- Crystal MIND and Crystal AutoReader User’s Manual
- Frequently Asked Questions
- Troubleshooting Guide

For further technical assistance, please contact BD Technical Services at 800.638.8663.



Screenshot of Crystal MIND V5.05A



Crystal MIND launched from Windows XP Mode – Windows Virtual PC

BD Protect™ Infection Prevention Team Delivers Enhanced Patient Safety with Cluster Analysis

The stories are legend. Some are published, others passed down from seasoned professionals who've battled stealthy invaders such as vancomycin-resistant enterococcal bacteremia in oncology patients or group A streptococci in surgical patients. Appearing seemingly at random in small numbers over an extended period of time, these organisms often evade even the most dedicated detectives. Sometimes a pattern or trend is noticed by a vigilant lab professional or infection preventionist. More often, these clusters or outbreaks may continue undetected for weeks or months, causing illness or even death.

Clusters of healthcare-associated infections are not rare, and some are random events. So investigating each one can be time-consuming and tedious when done by traditional "shoe leather" methods. The objective, of course, is to work quickly to identify a common source or risk factor, then interrupt the cycle of transmission and educate clinicians, patients and family to prevent further infections.

The links between infected patients can be subtle and complex. Perhaps a caregiver passed a pathogen from one patient to several others by sharing the same device or equipment between them; or, another caregiver – unknowingly carrying the pathogen – transmitted it to other patients.

To help clinicians detect clusters more quickly and efficiently, the BD Protect Infection Prevention (IP) data management

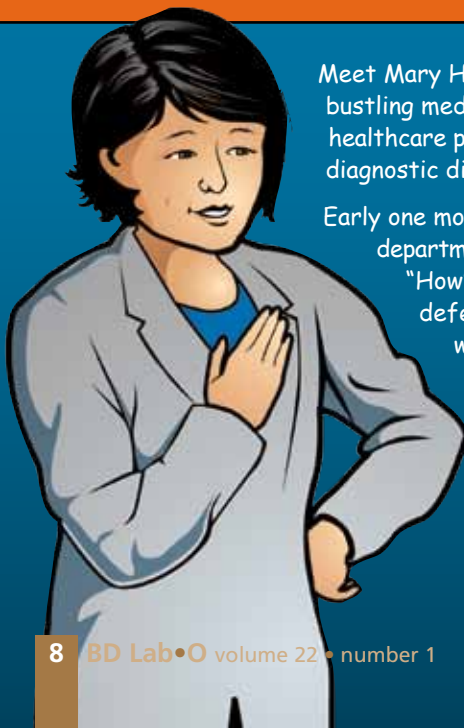
solution has a new cluster analysis and threshold detection feature that alerts clinicians to unexpected or unusual numbers of specific pathogens.

With this feature, BD Protect IP analyzes data from the hospital's laboratory information system to provide many different kinds of cluster and threshold alerts, including, for example, an alert when:

- The number of patients positive for a particular organism triggers a Threshold Flag for one unit, service or risk group.
- The number of VRE results is greater than a pre-specified (fixed) threshold for the facility.
- Any specified rare organism is cultured from two different patients on the same unit/ward during the last 7, 14 or 30 days.
- Any specified rare organism; e.g., *C. difficile*, is cultured from different patients admitted to the same room during the last 7, 14 or 30 days.

Alerts appear in the BD Protect Data Mining Center and can be opened to reveal more information in a line list, as shown at right. From there, the user can drill down with a single click of the mouse to the patient-level record to start fact-finding relative to each case.

1 Mary Holmes, Med Tech Super-Sleuth EPISODE ONE - PANIC IN THE EMERGENCY DEPARTMENT



Meet Mary Holmes, a medical technologist who works at Community General Hospital (CGH), a bustling medical center in the city of Sunny Valley, USA. Along with her co-workers and other healthcare professionals at CGH, Mary watches over the patients as a super-sleuth solving daily diagnostic dilemmas in the grotto of the clinical laboratory.

Early one morning on her way to the laboratory by way of the emergency department (ED), Mary encountered Larry the infection preventionist.

"How's it going, Larry?" asks Mary. Larry shakes his head with defeat. "The ED is being inundated with patients presenting with flu-like upper respiratory infections and coughing episodes, but the rapid antigen tests are mostly negative. Dr. Taylor is concerned we may have a whooping cough outbreak but we've yet to receive yesterday's lab results.

Can you look into it? We've got to get a handle on this situation quickly so we can take the right steps for control and prevention." Mary frantically picks up her pace knowing it will be another busy and long day in the microbiology laboratory.



BD Protect™ Solutions

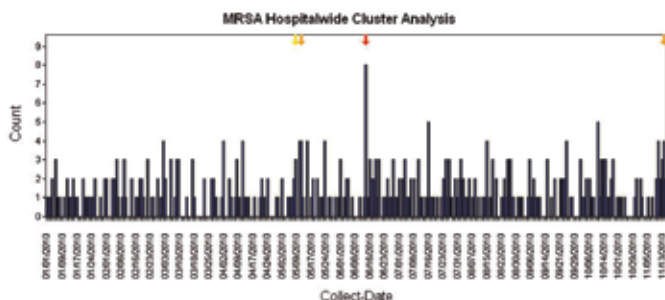


Med-Rec#	Pt-Name	Adm Date	Collect-Date	Pathogen	1st-Adm-Pos
M888011044	Dile, Mary Charle	11/09/2010	11/14/2010	MRSA	YES
M010993477	Bishop, Sarah Ann	11/14/2010	11/14/2010	MRSA	YES
M888011210	Jenkins, Shannon Colleen	11/14/2010	11/14/2010	MRSA	YES
M110923477	Pendleton, Xavier Donald	11/14/2010	11/14/2010	MRSA	YES

Thresholds can be set by the user, or calculated by BD Protect IP. Calculated thresholds are determined by built-in statistical tools that predict the probability that a point on a series of data over time is

abnormal. Blue, yellow, orange and red “flags” on a graph indicate the amount of variance from the “norm.” The different flag colors give the infection preventionist a visual cue as to the likelihood that these cases may be related. Red flags, for example, should be investigated immediately, whereas blue flags are less urgent.

The graph below shows an ongoing analysis of MRSA containing yellow, orange and red flags, based on the number of unique cultures detected from lab information system data over time.



“Preventing the spread of infections is becoming more challenging each day,” said Tracy Gustafson, M.D., Worldwide Director, Infection Prevention Software Development and Medical Affairs, BD

Diagnostics – Diagnostic Systems. “The problem is magnified by global travel, new and more drug resistant microbes, overuse and misuse of antibiotics, healthcare staffing cuts, and risks to immunocompromised patients. This new capability provides a powerful and intuitive way to identify and control the spread of infections before they mushroom into full-blown outbreaks.”

Clinicians can benefit from three BD Protect modules:

- **BD Protect™ Infection Prevention** targets reduction of HAIs in patients through real-time notifications and ongoing quality improvement.
- **BD Protect™ Syndromic Surveillance** continuously analyzes emergency department patient data for reportable diseases and symptoms that could signal a possible community outbreak. It also can be used at a Health Department to collect and analyze community-wide data from multiple hospitals.
- **BD Protect™ Healthcare Worker Safety** monitors employee vaccinations, testing, in-service education, injuries and illnesses to protect both employees and patients.

For more information on how BD Protect can help you and your patients, visit us on the web at www.bd.com/ds/bdprotect, e-mail BDProtect@bd.com, or call 800.426.8015.

Mary arrives at the lab and finds Sherry from the night crew busy finishing the early morning run. She'd had a rough night because they were short one tech and had to cover both blood bank and micro.

“Good morning, Sherry,” says Mary. “Where would you like me to start?” Sherry replied, “I pulled the positive blood cultures, read the Gram stains and phoned the nursing units with the results. I have three flu antigens cooking that need to be finished and called to the ED, and several specimens that need to be set-up. Oh, and Dr. Taylor wants the list of patients with positive flu test reports faxed to him. They are trying to find out if we have a seasonal flu or whooping cough outbreak.” Mary noticed there were numerous notes from the night staff as well for her to sift through.



Mary grabbed her lab coat and proceeded to tackle the priorities. After talking to Larry this morning, she knew it would take time and effort to collect and analyze all of the laboratory results, and that delays could result in chaos if the patients were not quickly diagnosed and managed. She also needed to find out why yesterday's pertussis PCR results had not been sent to the ED. Her techs had performed all of the testing, but Mary knew all too well about the workflow bottlenecks and disruptions the techs had to deal with. Her own pet peeve was responding to calls for non-critical lab results.

Continued on page 12.



BD's Global Health Initiative

Impacting TB Diagnosis and Treatment Around the World

BD's Global Health Initiative recognizes the importance of public-private collaborations in the developing world. As a result, BD regularly collaborates with several leading global health organizations to identify and implement sustainable solutions that will improve patient care in these regions. Summarized below are the highlights from last year.



Thailand: Laboratory training on liquid culture and drug susceptibility testing

In January 2010, BD and the Foundation for Innovative New Diagnostics (FIND) partnered with CDC's International Laboratory Branch of the Global AIDS Program, CDC Thailand and the National Tuberculosis Reference Laboratory (NTRL) of Bangkok, Thailand to organize a workshop on the detection, identification and drug susceptibility testing (DST) of *Mycobacterium tuberculosis* (TB). Mary Hellmann and Jasmine Jani, of BD Diagnostics, were two of the facilitators at the training session, along with representatives from FIND, CDC and NTRL-Thailand.



The 10-day workshop was designed to educate and train young TB scientists and technicians from India, Myanmar, Vietnam and Thailand on best practices using liquid culture for the identification and DST of TB and multidrug-resistant TB (MDR-TB). Special emphasis was placed on the quality control and quality assurance of laboratory practices.

The KAP (knowledge, attitude and practice) level of the participants was evaluated pre- and post-training. Needless to say, there was a significant increase. As one of the participants from India expressed, "this training increased my understanding, basic knowledge and grasp of laboratory practices for diagnosing TB. The lectures were informative and our hands-on exercises will help us to organize things more efficiently in our home laboratory."



Uganda and Ethiopia: Developing TB specimen referral systems

The identification, characterization, and management of district laboratories and remote healthcare centers in developing countries is difficult due to poor infrastructure and lack of skilled personnel. Thus, facilities capable of performing sensitive TB diagnostic tests and rapid MDR-TB tests are centralized to referral centers.

In response to this situation, Uganda's National TB Reference Laboratory developed a referral system whereby laboratory and postal workers learn safe specimen packaging, transportation and delivery to the National Reference Laboratory. To assist with this initiative, BD and PEPFAR (U.S. President's Emergency Plan for AIDS Relief) jointly introduced global positioning system (GPS) and geographical information system (GIS) technology to map TB microscopy sites and monitor laboratory quality improvements.

In 2010, with more than 900 collection sites mapped throughout Uganda, the

program helped ensure that more than 2,000 patient samples reached the laboratory for testing. Additionally, with BD and PEPFAR's support, servers and computer workstations enable data to be standardized and archived, and for patient results to be sent wirelessly to remote sites, improving both the quality of patient testing and the time it takes for the patient to be treated (see article "BD Volunteer Travels to Uganda" for more details).



BD and PEPFAR are now working with the Ethiopia Health and Nutrition Research Institute (EHNRI) and CDC-Ethiopia to develop a broader, integrated specimen referral system. As in Uganda, GIS technology will be used for monitoring laboratory results, introducing external quality assessment (EQA) data, and integrating lab data into health information systems.



Germany: Raising awareness at the IUATLD Meeting

In November, key opinion leaders, policy makers, NGOs, funding organizations, WHO representatives, clinicians and laboratorians gathered in Berlin for the International Union Against Tuberculosis and Lung Disease (IUATLD) annual meeting.



BD participated in the meeting by presenting its broad menu of TB diagnostic products at the exhibit booth. In addition, BD showcased a mock-up of a containerized TB lab



complete with a BD BACTEC MGIT 320 and BD BACTEC 9050 instruments and the BD EpiCenter™ System. This innovative approach developed by the Zambart project in Zambia uses containerized, semi-mobile TB labs to make TB diagnostics more readily accessible in regions of greatest need.



BD's Krista Thompson elected to Stop TB Partnership Board



Krista Thompson, Vice President and General Manager, Global Health, BD, was elected as the alternate board

member representing the private sector constituency in the Stop TB Partnership Coordinating Board.

The coordinating board provides leadership and direction, monitors the implementation of agreed policies, plans and activities of the Partnership, and ensures coordination among Stop TB Partnership components.



BD Volunteer Travels to Uganda

Courtney Maus, Ph.D., Project Scientist • BD Diagnostics – Diagnostic Systems

Since BD's partnership with PEPFAR (President's Emergency Plan for AIDS Relief) began in October 2007, over 30 BD employees have gone on volunteer trips in support of the PEPFAR Lab Strengthening program. One of the goals of this program is to increase tuberculosis (TB) diagnostics capabilities at the National Tuberculosis Reference Lab (NTRL) in Uganda. I was one of the fortunate volunteers who participated on the trip in June of 2010.

The NTRL, located in Kampala, is the only lab in the public sector offering culture and drug susceptibility testing (DST) of *Mycobacterium tuberculosis*. In September 2008, a TB specimen referral program was initiated to provide testing of specimens collected outside of Kampala. The program uses Posta Uganda services for transporting specimens and patient results between more than 900 referring sites and the NTRL. However, the Posta Uganda services are slow and, on occasion, samples or reports are lost leading to a delay in patient treatment.



Previous BD-PEPFAR volunteer trips concluded that the referral program needed a data management system as well as an effective means of returning patient results to the referring sites as quickly as possible. After evaluating several lab information system (LIS) options, the NTRL staff and BD-PEPFAR volunteers chose the BD EpiCenter™ System for its compatibility with the lab's BD BACTEC™ MGIT™ instruments.

The purpose of our trip was to train NTRL staff on the BD EpiCenter System. The lab uses two BD BACTEC™ MGIT™ 960 instruments for liquid culture and DST that we linked to EpiCenter. Over the course of two weeks, we trained four NTRL associates on how to use the EpiCenter software, including how to input, track, and report data for all of the other TB tests they run.

Another goal of the trip was to configure the BD EpiCenter System for automatic transmission of test results to SMS (Short Message Service) printers. It was the first step toward a final goal of having SMS printers at referring labs across the country receiving results electronically. This plan could drastically decrease the time it takes results to reach labs and physicians, thereby hastening diagnosis and treatment of the patients.

The staff at NTRL were very bright and enthusiastic and they learned a great deal of information in a relatively short amount of time. They were excited about the ability to capture and print information on barcode labels so patient details and test results could be tracked and recorded efficiently and accurately. They were further excited about the prospect of decreasing the delivery time of results back to the referral sites through the use of the SMS printers. I am thoroughly grateful for the opportunity to not only work with and teach, but to learn from the dedicated and talented members of the NTRL.



P.A.C.E.®-Accredited Workshops Available at a Location Near You

The BDINFORM education series workshops were so successful in 2010 that we have scheduled a new series for 2011.

- February 15 West Conshohocken, PA
- February 24 ... Davie, FL
- March 9 Ontario Airport, Canada
- April 5 Seattle, WA
- April 28 Indianapolis, IN

These workshops are designed to:

- **Educate.** BD is committed to being an educational partner with Clinicians, Laboratorians, Infection Preventionists and Hospital Executives to help improve patient care and outcomes.
- **Inform.** The workshops will provide highly relevant, impactful updates in the field of infectious diseases. In addition, guest speakers at each event will deliver P.A.C.E.®-accredited presentations on today's most important microbiology topics.
- **Innovate.** Our products and services assist in providing solutions for the prevention, diagnosis, and management of infectious diseases through innovation, high quality and cost-effective diagnostic products. Through continuous advancements, BD helps bring you fast, accurate clinical diagnostic information to help guide the most appropriate patient care and drive laboratory efficiency.

Visit our web site at www.bd.com/ds/BDInform to reserve your seat or e-mail your RSVP to bdds_marcom@bd.com within 10 days of your selected workshop.

Mary Holmes • *Continued from page 9*

Meanwhile, Larry was searching through all the ED admissions and cross-referencing patients with flu-like symptoms with lab results to determine the status of flu in Sunny Valley. Dr. Taylor was doing the same to sort out the clinical presentation and diagnostic testing capabilities of CGH. In the event of a flu outbreak, he needed to be able to increase throughput, enhance efficiency and optimize resources. The hospital was understaffed, and flu season was just beginning.

Back in the lab, Mary and her staff spent a long day performing diagnostic tests, sorting through the positive results, notifying all key hospital staff by phone, and printing reports for Larry, Dr. Taylor and the health department. "There has got to be a better way of dealing with these crises," Mary said to herself. **It was just a matter of getting the critical information to the right people at the right time.**

Mary booted up her computer and started searching for solutions online. She quickly determined they needed help in the data mining realm. She found the BD Protect™ family of solutions and in particular, the BD Protect™ Syndromic Surveillance (SS) program. The BD Protect SS program searches for combinations of signs and symptoms in emergency room populations to identify syndromes and possible outbreaks. The program would save valuable time by eliminating the need to manually review every ED admission.

With the long turnaround time on pertussis PCR testing, syndromic surveillance could provide Dr. Taylor critical information and save time by condensing data into a simple, single line list. Additionally, automated alerts send "red flag" threshold alerts by email to designated staff. Mary decided she would call a meeting with Larry and Dr. Taylor ASAP to discuss next steps.

Stay tuned for the next episode of Mary Holmes, Med Tech Super-Sleuth.



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